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THE IRON AGE

THURSDAY, JULY 5, 1888.

Steam and Its Rivals.

Prof. Robert H. Thurston, writing in the *Forum* for May, on the various attempts which have been made to supplant steam by some other fluid for working engines, says:

A few years ago, disappointed in the hope of being allowed to make a careful and crucial trial of the best recent devices of this seductive class for the benefit of a wealthy friend, who was ready, if so advised, to "take a little stock," I had a very complete study made of the several

cent. better—quite too slight a difference to be considered, and probably much more than compensated by the greater waste by friction to be met with in the larger machine. Comparing them between the temperatures customary in the steam engine as ordinarily operated the results were essentially the same, and when studied as working fluids, with the same back pressures in all cases, substantially the same results were again found. The final conclusions were beyond doubt that the limit being taken as the admissible pressure, steam is the most efficient of all, and

dous waste which is apparently unavoidable in our present methods of utilization of the grand source of artificial power, the energy of heat motion.

Improved Tail-Rope Engine.

Through the courtesy of Messrs. I. A. Finch & Co., of Scranton, Pa., we are enabled to present in this issue engravings of their improved tail-rope engine. It is of the double cylinder reversing type, the cylinders measuring 12 inches by 20

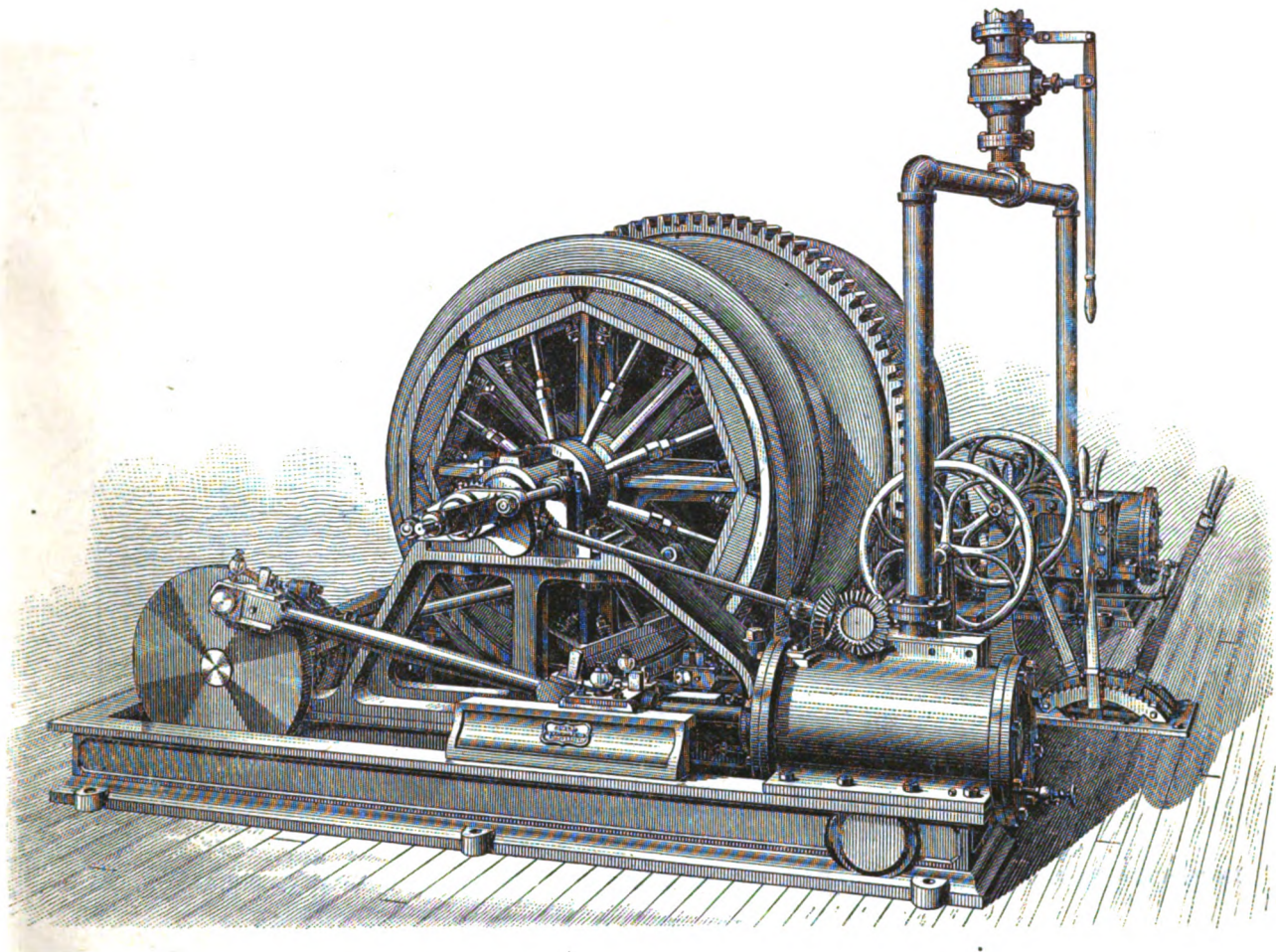


Fig. 1.—General View.

IMPROVED TAIL-ROPE ENGINE, BUILT BY MESSRS. I. A. FINCH & COMPANY, SCRANTON, PA.

vapors best adapted for such use, thus securing a correct scientific comparison of the possibilities, if not of the practicalities, of the several presumptive rivals of steam as a motor. Comparing alcohol, ether, carbon-disulphide (dipulphide of carbon) and chloroform, the most promising of the available fluids, with water and its vapor, steam, it was found that, as the well-known laws of thermo-dynamics indicate, all were of precisely equal efficiency if worked in perfect engines within the same range of temperature, with no waste occurring other than that which has already been described as unavoidable. If worked, in each case, through the range of pressure familiar to us as employed in the steam engine, it was found that steam required the smallest engine to do a given amount of work. It was also the most economical, with the single exception of chloroform, which was a fraction of 1 per

cent. better—quite too slight a difference to be considered, and probably much more than compensated by the greater waste by friction to be met with in the larger machine. Comparing them between the temperatures customary in the steam engine as ordinarily operated the results were essentially the same, and when studied as working fluids, with the same back pressures in all cases, substantially the same results were again found. The final conclusions were beyond doubt that the limit being taken as the admissible pressure, steam is the most efficient of all, and

inches, and is built in the most substantial manner, with every provision for high speed and severe duty. The links, as shown in Fig. 2, are of the solid pattern, sliding in blocks provided with gun-metal slides, and having screws and jam-nuts for adjusting and taking up lost motion. The cross-head slides, connecting rod and valve-stem boxes are of gun metal, with large wearing surfaces. The piston rods, valve stems, crank pins, crosshead pins and link pins are of steel. The main boxes are Babbitt-lined, bored and fitted thoroughly. The crank-shaft is of hammered iron, and all materials used in the construction of the engines are of the best possible quality. The bed-plates are made broad, and are strongly bracketed to receive and support the heavy stands on which rest the adjustable pedestals and boxes of the drum-shaft. This shaft is also of hammered iron, the diameter and weight depending

on the length of shaft required for the service. On this shaft, midway between the engine, is firmly keyed a spur-wheel 6 feet in diameter. This wheel is driven by a pinion on the engine shaft, the proportions being one to four. On each side of the spur-wheel is a cast iron drum running loose on the shaft, capable of winding 6000 feet of $\frac{1}{4}$ -inch steel wire rope. These drums are driven by friction clutches known in the coal regions as "umbrella frictions," a term of which the significance will become at once apparent by a glance at our engravings. These clutches are operated by screws at the ends of the shafts by means of the miter gears and shafts, which bring the hand-wheels of both drums convenient to the hands of the engineer. Fig. 3 clearly explains this. Each drum is also provided with a substantial brake, that of the left-hand drum being controlled by the right-

Steam Navigation.

The semi-centennial of transatlantic steam navigation, dating from the first voyages of the steamships *Sirius* and *Great Western*, in 1838, gives a special propriety and pertinency to a retrospective glance in which we gather for review the records of steam navigation since the year 1813, as culled from newspapers in the United States. As best serving this purpose we take a file of *Niles' Register* and find therein a notice of the launch of the steamship *Savannah*, built by Wm. H. Brown, of New York, at his yard on the East River, and which earned distinction by making the pioneer voyage across the Atlantic in 1819. The experimental efforts of Fulton and Livingston have a peculiar piquancy when considered from the standpoint of the contemporary ob-

Congress refusing to grant a mail contract which would be a fair offset to the heavy subsidy received by his British competitor—we may date the decadence of the American ocean marine.

The following extracts from *Niles' Weekly Register* begin with a reference to the successes of Fulton:

May 22, 1813.—Eight, and occasionally nine, steamboats are now used at New York for the transportation of passengers and goods to and from that metropolis. Several others are building. Used as ferry-boats they have almost suspended the necessity of a bridge over the Hudson by the safety, convenience and regularity of their passage. Three go to Albany, one to Amboy, one to Tappan, one to Hoboken, one occasionally to Elizabethtown (N. J.), and one is building as a packet to New Haven, Conn., besides those for ferries.

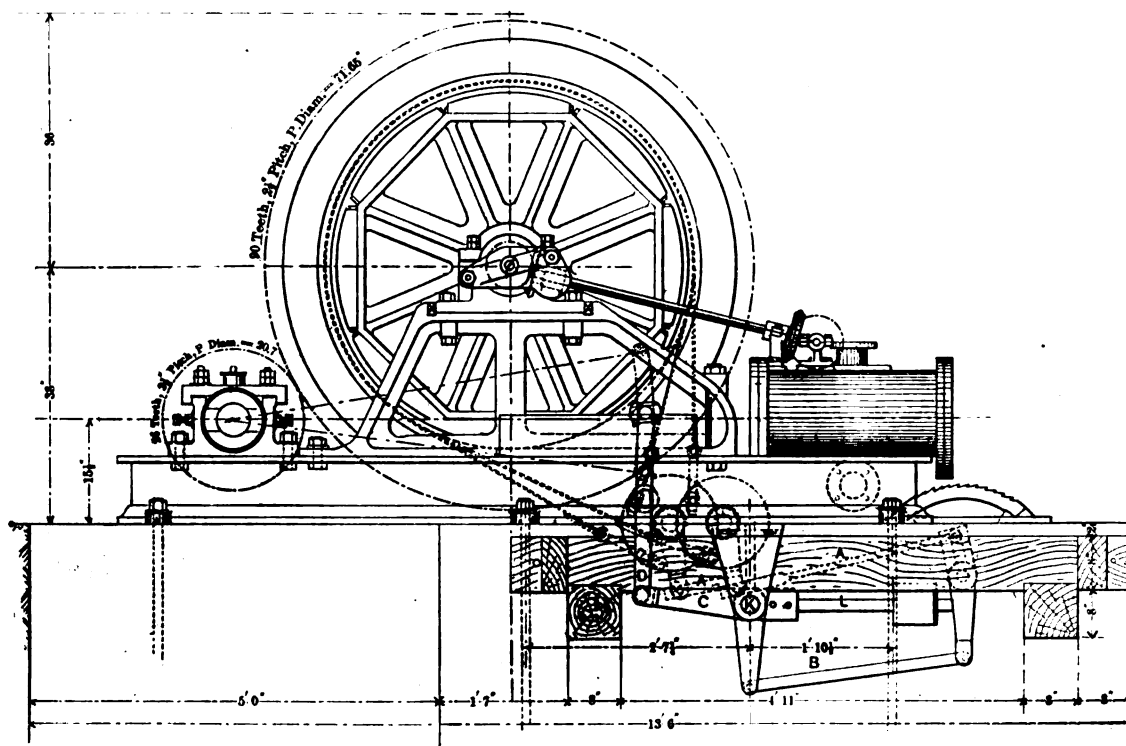


Fig. 2.—Side Elevation.

IMPROVED TAIL-ROPE ENGINE, BUILT BY MESSRS. I. A. FINCH & COMPANY, SCRANTON, PA.

hand lever and *vice versa*. Thus when the rope is winding in on the right-hand drum the left-hand drum, running loose, is paying out, and is under perfect control by means of the right-hand brake lever. Those brake levers, as shown in Fig. 1, have latches by which they may be set at any point, giving any degree of resistance desired. The lever shown between the brake levers is the reversing lever of the engines, and is substantially the same as the reversing lever of a locomotive. In Fig. 1 the throttle-valve is shown overhead, but in situations requiring it, as sometimes inside the mines where it is expensive to take down roofs, the throttle-valve and lever may be placed below.

These engines and drums are adapted to any situations where tail-rope engines can be used. They are simple and easily managed, and are not as costly as some of the complicated machines which have been brought out for this purpose. They are built in different sizes, the largest for which patterns are completed having 16 x 24 inch cylinders. They are compact, require little room, and are powerful and efficient machines.

server. And at this later day, when Buffalo, Detroit, Cleveland and Chicago are each the rendezvous of large fleets of iron steamships, and when the commerce passing through the "Soo" Canal compares favorably in point of tonnage with the entire foreign trade of the United States, it is refreshing to read of the wild antics of the savages who flocked to the banks of Lake Erie when they beheld the approach of the first steamer that awakened the solitudes with its screeches. Thus it happens that within the memory of men now living steam has gained the supremacy on all inland waters of the United States from the lakes to the Gulf, and on the ocean as well. Instead of a forest of masts encircling New York City, as in bygone years, we have only the occasional visits of mammoth iron-plated steamships as they flit to and fro between the hemispheres. Unfortunately, while Americans may glory in the achievements of Fulton, Fitch and Livingston, they have to deplore the disasters that befel the Collins line just at the critical moment when the American eagle seemed to have won in the contest with the British lion. From that reverse—in

June 4.—Letter to the editors of the *National Intelligencer*, dated Pittsburgh, April 22, 1814: This morning the steamboat *Vesuvius*, intended as a regular trader between New Orleans and the falls of Ohio, left Pittsburgh. A considerable freshet in the river renders it probable that notwithstanding the great size and draft of the vessel she will pass the falls without difficulty, after which she will meet with no obstruction in the rest of her passage. There is now on the stocks here just ready to be launched a boat adapted to the navigation of the Ohio above the falls which will be finished in time to meet the *Vesuvius* on her return from New Orleans at the falls. The boats are built by Mr. Fulton, under the agency of Messrs. Livingston and Lathrop, for companies who have vested very large capitals in the establishment. The departure of the *Vesuvius* is a very important event, not only for this place but for the whole western part of the Union, and its influences will be felt over the whole of the United States. In describing it, it is necessary to use the inflated language which, unfortunately for the credit of our trade, too often renders

real facts incredible, or at least lowers their importance by the manner in which they are puffed into notice. * * *

It does not require the ornament of metaphor to impress upon the public mind the incalculable advantage of an intercourse by water effected in large vessels, which move with certainty and rapidity through an extent of internal navigation embracing a space almost as large as the whole conti-

any further extent, as the navigation by steam was thought to be much on a footing as to practicability with the navigation by the reindeer in the Chancellor's park.

The steamboat Vesuvius went from Pittsburgh to Louisville, 767 miles, in 67 hours 25 minutes, equal to $10\frac{1}{4}$ miles per hour! The city of New York is enjoying immense advantages from these vessels, as

67 $\frac{1}{4}$ hours; from Shippingport to Natchez, 125 $\frac{1}{4}$ hours; from Natchez to New Orleans, 33 hours. Total from Pittsburgh to New Orleans, 227 hours.

April 22, 1815.—A large steamboat was about to be launched in England to run as a packet between Dover and Calais, and will no doubt do very well, as the one that plies from New York to New Haven, through the Sound, answers every expect-

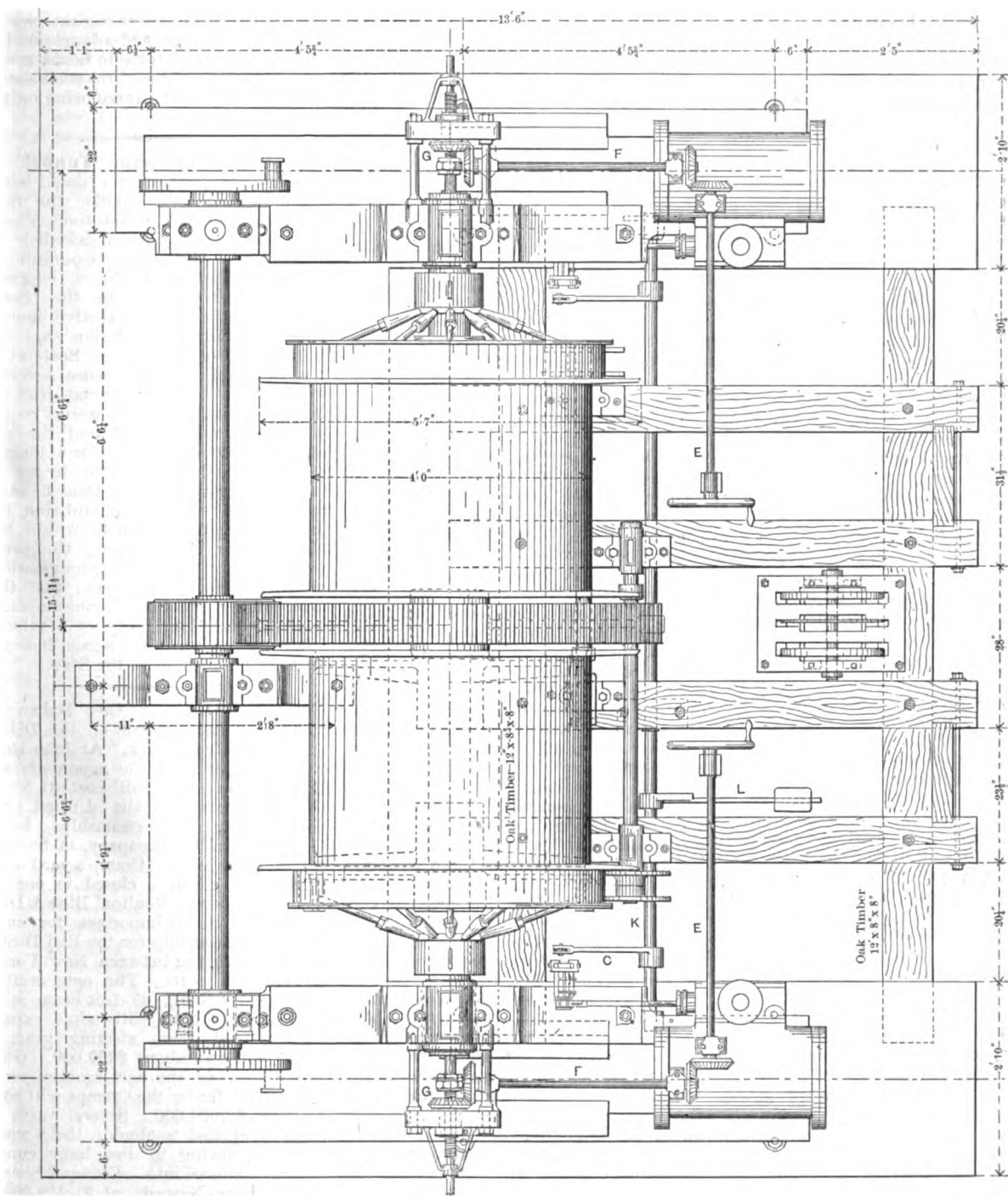


Fig. 3.—Plan.

IMPROVED TAIL-ROPE ENGINE, BUILT BY MESSRS. I. A. FINCH & COMPANY, SCRANTON, PA.

ment of Europe, and comprising in it the productions of almost every climate. This intercourse, though now only in its infancy, must in a few years become of immense magnitude. When the late Chancellor Livingstone applied for his grant for the exclusive navigation by steam on the North River to the Legislature of New York for 30 years, on condition that he should actually accomplish it, a very sensible member of the Legislature told me that he could easily have had a grant of

packets and ferry-boats; loaded wagons are hourly seen in that city from Long Island and New Jersey. John L. Sullivan, of Boston, has obtained a patent for the use of steam-engine power in towing luggage-boats, being a new and useful application of steam engines, and put in practice by him on Merrimac River.

July 9, 1814.—Astonishing Passage.—The steamboat Vesuvius made the following passage from Pittsburgh to New Orleans: From Pittsburgh to Shippingport,

tation, even steering well by the compass, in case of fogs, notwithstanding the quantity of iron on board of her.

May 20, 1815.—The steamboat *Fulton* lately proceeded from New York through the Sound to Connecticut River and up that river as far as Middletown. She had a band of music on board. As the boat passed Petti Plague the musicians played the royal airs of "God Save the King" and "Rule Britannia" in compliment to the defenders of that place.

July 1, 1815.—By a letter from an officer of the steamboat *Enterprise* we are informed that her last trip from New Orleans to Natchez was made in four days—a distance of 313 miles—against the strong current of the Mississippi, without the aid of sails.

August 5, 1819.—Last Saturday evening the steam was first tried on the *Dispatch*, another steamboat lately built at Bridgeport and owned, as well as the *Enterprise*, by the Monongahela and Ohio Steamboat Company. We are happy to learn that she is most likely to answer the most sanguine expectations of the ingenious Mr. French, the engineer, on whose plan she is constructed. It is expected, when her works are in complete operation, she will pass through the water at the rate of nine miles an hour.

February 28, 1818.—The steamboats at New York have been successfully used in towing large and heavily laden ships into the harbor. One of them was towed against wind and tide at four miles an hour.

April 25, 1818.—Steamboats are multiplying on the Western waters. One is running between St. Louis and New Orleans.

July 11, 1818.—A steamboat of 320 tons, called "The United States," was launched at Baltimore on the 4th inst. She is the largest boat on the Chesapeake—145 feet in length and 27 wide.

August 15, 1818.—It is stated that a two-masted steamboat is nearly completed at Philadelphia to ply as a packet between that port and Havana.

August 22, 1818.—The *New Orleans Chronicle* gives us a list of 20 steamboats, carrying near 4000 tons, which trade from that port from the upper and adjacent country.

August 29, 1818.—A large steamship called the *Savannah*, and intended to ply between that port and Liverpool, under command of Captain Moses Rodgers, was launched at New York on the 22d inst.

September 19, 1818.—The first steamboat arrived at Kaskaskia on the ult. It was the *Franklin*, from New Orleans, in 18 days running. Erie, on the Lake Erie, was in like manner first visited by a steamboat on the 21st ult.

October 3, 1818.—The Erie steamboat, from Buffalo, arrived on her first trip to Detroit on the 27th August. The *Detroit Gazette* observes: "Nothing could exceed the surprise of the sons of the forest on seeing the Walking in the Water moving majestically and rapidly against a strong current, without the assistance of sails or oars. They lined the banks above Malden and expressed their astonishment by repeated shouts 'Tai-yon nichee!'"

October 17, 1818.—Inventor of steamboats, Mr. Chaumont, a naval engineer at Paris, has published a large work, entitled "The History of the Rise and Progress of Steamboats in America, England and France." In this work he tells us that Dr. Franklin, when in Paris, suggested the idea of steamboats to several of his acquaintances.

The *Register* of October 24, 1818, gives a list of 17 steamers, comprising 3642 tons, trading to New Orleans.

January 30, 1819.—The steamboat *Walking in the Water* is advertised to take a trip from Buffalo to Michilimackinac, to perform the entire trip in 12 days.

April 15, 1817.—The new steamboat Chancellor Livingstone, a packet between New York and Albany, is of 500 tons burthen, and cost \$110,000. Her average speed is estimated at 8 miles per hour.

August 30, 1817.—Oliver Evans announces his discovery of the possibility of constructing boilers "that cannot be exploded by the elastic power of steam to

any dangerous extent," the editor remarking that the "daily increasing importance of steam navigation and the weighty consequences that are depending upon it renders its safety the common concern of all the civilized world."

October 11, 1817.—A Louisville paper states that there are nine steamboats building on the waters of the Ohio and the Mississippi, which will complete the number of 20 on those waters.

December 20, 1817.—The steamboat Massachusetts has departed from Salem "on a voyage for North Carolina on Mobile."

The *Register*, in its supplements for 1815-16, copies from a report to a committee of the British House of Commons by the engineer of a steamboat called the *Thames*, 72 tons, arrived at London from Glasgow, the object of the trip being to ascertain the most "expeditious and the safest mode of conveying the mail to Dublin," as follows: "This voyage demonstrated that steam engines are applied to propel vessels at sea in all kinds of weather; that they have the peculiar advantage of going against winds and tides and in a calm, when another vessel could not at all proceed; would go at the rate of from seven to nine knots per hour; they are more secure than vessels with sails, as they cannot be lost on a lee-shore."

The *Register*, same date, copies from the *New York Columbian* as follows: "Wonderful traveling. The steamboat *Fulton*, Captain Dunker, sailed from this place on Sunday morning, after 9 o'clock; arrived in Albany in 20 hours; remained there 7 hours; left there on Monday, after 12 o'clock, and got back here in 19 hours, before 7 o'clock yesterday morning, thus having performed a passage from New York to Albany, a distance of 160 miles, and back again, besides stopping at the different landings, going and coming, in 46 hours—an occurrence, we presume, never equaled in this country. The whole distance was at least 320 miles, and was run without a sail up, or any advantage whatever from the wind, in 29 hours, making a general average of 8½ miles in an hour. (The engine was stopped over 20 times on passages, 8 of which, each way, were at regular landing places, and the weight on the safety-valve averaged less than 3 pounds during the whole time, when 8 pounds would have driven the boat 9 miles an hour.) Then or even seven years ago nothing short of supernatural agency was supposed capable of effecting what we now see accomplished by the genius of Mr. Fulton. Since the invention of balloons no human contrivance has given to motion and conveyance such speed and certainty, with equal safety and comfort as the establishment of steamboats, by which a person is now carried 160 miles in one day, and brought home the next, and performs his journey in about the same time it formerly required to go to Amboy, Sandy Hook, or any distance of 20 miles and back again. So astonishing and beneficial is this truly admirable American invention.

A Fast War Ship.—One of the fastest war ships of the world is undoubtedly the torpedo aviso *Greif*, of the German Navy, which on her recent voyage from Kiel to Wilhelmshaven attained a speed of 23 knots an hour. The *Greif* was launched in 1886, and was built, of steel, at the Germania Yard at Kiel, from designs by the German Admiralty. Her displacement is 2000 tons, and her engines have an indicated horse-power of 5400. From these figures and her exceedingly fine lines, which give to the vessel the appearance of a torpedo-boat of immense size, it will be seen that speed was the chief object aimed at in her construction. The *Greif*, consequently, may be looked upon as one of the fastest, if not the

fastest, vessel of any maritime power, if we except the *Ouragan*, of the French navy, and some foreign torpedo-boats built in English yards, and which beat her record. The entire space of the *Greif*—of which vessel the Germans may well be proud—with the exception of the space provided for crew and stores, is taken up by boilers, engines and coal bunkers. The vessel is of the class called torpedo-boat hunters, and to aid her in that service she is provided with two powerful electric search lights, two light guns of great range, and a large number of those bugbears of torpedo boats, revolver guns. The *Greif* has three smoke-stacks, and carries no sails, there being only two short lookout masts.

Another Submarine Tunnel Proposed.—The question of a tunnel between Sealand and Sweden, under the Sound, had not been heard of for some time till the other day the Royal Swedish Commissioners, who were examining M. Delangle's application for a concession, sent in their report to the Swedish Government. This exhaustive document winds up with the conclusion that a submarine railway between Sealand and Sconia would no doubt insure several advantages to the international traffic, but that, as the building of it would require a very considerable capital, and the paying of the interest on the cost for a long series of years would necessitate heavy subventions from both the Danish and the Swedish Governments, in addition to the profits of the traffic, which would be inadequate for this purpose, the proposal for this new way of communication be abandoned for the present; that should ever, under altered circumstances, the want or the desirability of a submarine railway come into prominence, it ought to be built on account of the State.

Shipbuilding on the Delaware.—The shipbuilding yards on the Delaware are crowded with work. At John Roach's yard at Chester is the mammoth sound boat *Puritan*, which will cost \$1,500,000, two gunboats for the United States Government, two steamships for the Ocean Steamship Company, of Savannah, and a steam yacht. Cramp's yard is full. The latest contract closed is one with Cramp & Sons by Boulton, Bliss & Dallett, New York coffee importers, for an iron passenger steamship for the Red D Steamship Line, to run between New York and Venezuelan ports. The new craft will be 264 feet long, 35 feet beam and 20½ feet depth of hold, with triple expansion engines and steam steering gear. The vessel will cost about \$200,000. Government work on the new cruisers recently contracted for by the Cramps will amount to over \$6,000,000. Several yards have been compelled to double their working capacity, owing to the large contracts recently entered into. Cramp & Sons have the cruisers *Newark*, at \$1,248,000; the *Baltimore*, at \$1,325,000; the *Philadelphia*, at \$1,350,000; the gunboat *Yorktown*, at \$455,000, and the dynamite cruiser *Vesuvius*, at \$250,000. In the merchant line they have a Clyde steamship for the New York and Jacksonville trade, to cost \$225,000; a Morgan liner in place of the lost steamship *Eureka*, to cost \$250,000, and a steamship for the South American passenger and coffee trade, to cost over \$225,000. In addition the firm have a lot of miscellaneous work in the building of engines and boilers for hulls built elsewhere. President Elijah Smith, of the Oregon Railway and Navigation Company, is having built at Neafie & Levy's works a large iron steamship for the Pacific Coast trade to cost over \$175,000. A number of iron tugs and steam yachts are being constructed at the same yard.

The Duty on Wire Rods.*

I am the bearer of a petition which I have the honor to present herewith, relating to the question of a reduction or any change in the existing duties on wire rods. The petitioners received only very brief notice that a hearing would be granted to parties interested in this industry, otherwise the petition would have been more complete and would have borne a greater number of names.

I not only represent the manufacturers and citizens of Joliet, who signed the petition, but I also represent the Joliet Steel Company, manufacturers of Bessemer steel, who are now building a wire-rod mill capable of producing 25,000 to 30,000 tons per annum, all of which will be for sale upon the general market, as the company are not manufacturers of finished wire.

Permit me briefly to review the position of this industry:

The United States consumes about 350,000 tons of wire rods per year, requiring about 420,000 tons of pig iron or 675,000 tons of iron ore to produce them.

Under the existing tariff laws, permitting the anomaly of a more expensive, smaller-sized wire rod—namely, No. 6—to be imported at a lower rate of duty than the larger size, No. 5, the industry of manufacturing wire rods in the United States has been retarded, and about one-third of the amount required by this country is annually imported. This would not be the case if the duty was adjusted equitably to the cost of manufacture, and, in that event, the people of the United States would be benefited by the raising of the additional iron ore, coal, limestone, &c., required to make the pig iron and by the conversion of the pig iron into the steel necessary to manufacture the home rods to supplant the imported. Reducing the matter to a merely local issue, can it be denied that the town of Joliet, and the surrounding country which supplies it with the necessities of life, would be better off if we had more diversified steel industries, instead of being limited, as we are at present, almost exclusively to the manufacture of steel rails? It is well known that railroad building in the United States fluctuates very widely. Hence in some years our mills lie partly idle and our men must submit to enforced idleness if we make nothing but rails. Such has been the case this year, when, in spite of reductions in the cost of raw material and labor, we have been unable to compete with the existing low price of foreign rails imported into California under the present tariff. Twenty thousand tons of foreign rails have already entered California this year, thereby taking the place of the product of a large American mill for one month, throwing out of employment for that period not less than 2000 men directly employed in the steel industry, exclusive of all those indirectly engaged in mining iron ore, coal, &c.

It has been our purpose for some years past to add other branches to our business, and only the uncertainty of tariff legislation and the low price of imported rods debarred us from undertaking the manufacture of wire rods at an earlier date.

What is the so-called "raw material" of the rod manufacturer—billets or small blooms? Can he procure them in this country at a price to enable him to compete with foreign manufacturers of steel wire rods? Emphatically, no! for the reason that it is impossible for a manufacturer at the present stage of development and at the present rates for labor in this country to transport the varied materials required in the manufacture of steel to any

given point and there produce a bloom or billet as cheaply as they can be produced abroad. The wire-rod manufacturer, therefore, pays for his raw material a much higher price than his foreign rival, and the necessary waste incurred in the manufacture of the finished product costs the wire-rod manufacturer the high price of the initial process (namely, billets), and, in addition, he has to pay very much higher wages in the rod mill than those paid by the German or English manufacturer.

It may be said that American ingenuity and the greater productive capacity of the American workmen counteract the drawbacks that I have named, but I can assure you that it is only the developments of American mechanical ingenuity in the processes of our rod mills and the cheapening of the costs of manufacturing steel in recent years that have made it possible to successfully embark in the manufacture of rods under the present rates of duty; at no lower rate of duty would the business be possible.

It has been claimed by wire manufacturers who have no rod mill of their own that they are at a disadvantage in comparison with wire manufacturers who make their own rods. It might with equal propriety be claimed that the rod manufacturers who do not convert and roll their own steel are unable fairly to compete with those who do. This argument might even be carried back to the ownership of a blast furnace and an iron-ore mine. Is that, however, a sufficient plea for handing over the market of the United States to the foreigner? Would the wire manufacturers have any good reason to expect that if our rod mills be closed or no further extensions be made, that the German manufacturer, having the market of the United States at his command, would reduce his price, or even continue to sell at the existing rates? If history is of any value, such an expectation is undoubtedly a snare. What is it save home competition that has reduced the selling price of iron and steel rails, sheet steel, nails and merchant steel of all kinds below prices ever touched before in this country?

It has also been claimed by interested parties—namely, importers or agents of foreign firms, that basic steel rods No. 6 are necessary to the well-being of American wire manufacturers and cannot be produced in this country. It would seem to be sufficient reply to this argument that upward of 200,000 tons of Bessemer steel wire rods have been successfully produced and made into wire in the year 1887 in the United States without any complaint arising as to the quality of the article manufactured.

It is not necessary for me to trouble you with tables of comparative wages paid here and abroad, because I believe it to be an already admitted fact that the compensation for labor in this country is from two to five times greater than in Europe, thanks to the beneficent results of protection which has fostered our magnificent and varied system of industries.

I respectfully urge, therefore, that you maintain a protective tariff sufficient to compensate the manufacturer for the disadvantages under which he presently labors, enabling him to continue paying the present favorable rates of wages, and also to permit the transportation companies to pay the men employed by them handsomely as they do now in comparison with the wages earned by their fellow workers abroad in transporting the mineral and manufactured products of foreign countries.

One of the attractions of the Brussels exhibition is a circular undulating railway, after the well-known type of the switchback railway.

Cost of Electric Street Cars.

The Fourth Avenue Street Car Company, notwithstanding the adverse vote by the Common Council, have decided to run their cars from Fourteenth street up to Harlem by their new device, the electric motor. Before deciding upon the change, however, the directors appointed experts to make calculations as to the ratio of cost, gain and loss in the three methods of propelling street cars. The following is the result:

	Electric.	Horse.	Cable.
Cost of cars.....	1	0.54	0.81
Motive power.....	1	1.45	1.06
Construction of roadway..	1	0.53	2.09
Depreciation and repairs..	1	1.47	2.04
Operating expenses (including wages).....	1	3.38	1.71
Totals.....	5	7.37	7.74
Average.....	1	1.47	1.55

There are now 60 electric street railways in the United States. The question is no longer concerning the success of the electric motor, but what kind of motor should be used—whether it shall be by continuous current or the storage batteries. The Fourth Avenue Company have selected the storage batteries and separate motors. A depot will be erected midway on the line of railway where the batteries can be recharged when necessary. It is expected that one set of batteries, eight on either side of the car, will run for two consecutive trips. Since the action of the aldermen, it is stated that the board, feeling the weight of public sentiment too strong against them, are disposed to reconsider their action.

Prices of Rare Alloys.—P. W. L. Biermann, of Hanover, Germany, who makes a specialty of the manufacture of metal alloys, has sent us the following quotations: F.o.b. Hamburg and Bremen, net cash: Aluminium metal, in lots of 100 kg., 49 marks per kg.; aluminium brass, 300 marks per 100 kg.; 2½ per cent. aluminium bronze, 300 marks; 5 per cent. aluminium bronze, 400 marks; 7½ per cent. aluminium bronze, 560 marks, and 10 per cent. aluminium bronze, 670 marks per 100 kg. He quotes 5 per cent. ferro-aluminium, 550 marks, and 10 per cent. ferro-aluminium, 650 marks; 1½ silicon bronze, 300 marks, and silicon bronze for conductor wire, 260 marks; 3 per cent. silicon copper, 550 marks, and silicon copper, running from 3 to 4 per cent., 650 marks. manganese copper, 30 per cent., is quoted 475 marks, while 4 per cent. manganese bronze, rolled, is offered at 250 marks, and 15 per cent. pure manganese bronze is quoted 290 marks. Metallic cadmium sells at 620 marks; phosphor-copper of 10 per cent. is quoted 320 marks, and for 15 per cent. material 450 marks, while phosphor-bronze sells at 190 marks. Nickel bronze, No. 200, is quoted 180 marks per 100 kg.; Wolfram metal, 94 to 98 pure, 400 marks; chromium, 1200 marks, and Rose's metal, melting at 195° celcius, 1500 marks, and Wood's metal, melting at 178° celcius, 1600 marks. A number of different alloys for brasses and Babbitt metal are also quoted, which are, however, of less interest than those named.

Among the labor organizations of the country is the International Brotherhood of Boiler Makers and Iron Ship Builders' and Helpers' Protective and Benevolent Union of the United States and Canada. The annual session of this body was held in Chicago recently. The following officers were elected: Thomas J. Curran, New York, president; Vaughn Morgan, San Francisco, vice-president; Charles Keiffer, Reading, Pa., treasurer, Philip Starkey, Chicago, secretary. The union adjourned to meet in New York in June, 1889.

*Argument by W. R. Stirling, presented before the Finance Committee of the Senate, June 18, 1888.

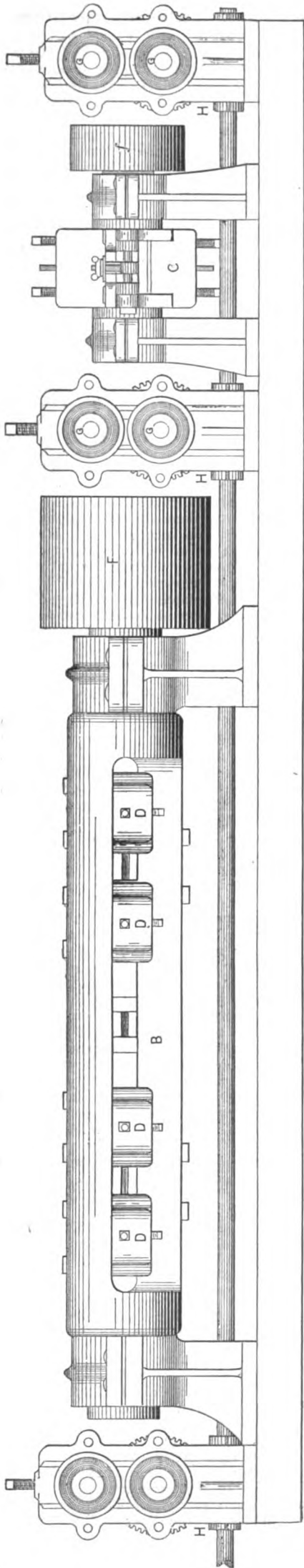


Fig. 1.—Front Elevation.

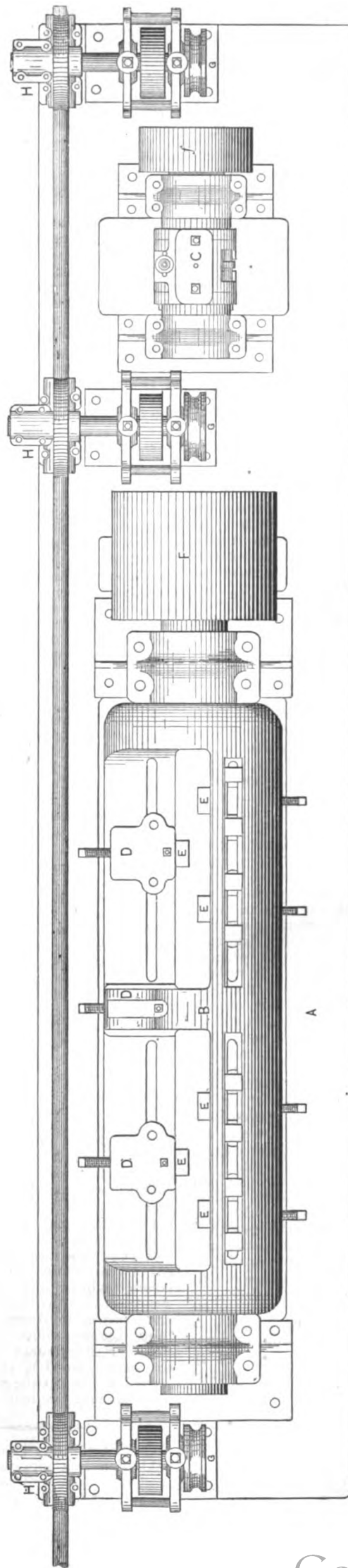


Fig. 2.—Plan.

ROTARY SHAFT STRAIGHTENING AND POLISHING MACHINE, BUILT BY THE AKRON IRON COMPANY, AKRON, OHIO.

Rotary Shaft Straightening and Polishing Machine.

We present on this and the opposite pages elevation, plan and cross sections of a rotary shaft straightening and polishing machine, designed for 4-inch shafting, and recently built by the Akron Iron Company, of Akron, Ohio, for use in their works. They now employ three machines of this kind, the smallest in use straightening and polishing on an average per day 3000 feet of shafting of from $\frac{1}{4}$ inch to 1 inch in diameter. The part of the machine which straightens the shafting and which is termed a "flyer," B, is formed with hollow journals and is rotated by means of the pulley F. It is further provided with straightening blocks, arranged in alternate order on opposite sides of the axis. These blocks, E, are shown more clearly in Fig. 3, from which it will be observed that they are adjustable between the side bars of the flier and the chucks D by means of set-screws. The side bars, as shown, are slotted, enabling the chucks D to be adjusted and bolted as desired. The polisher C is also formed with hollow journals, and is rotated by means

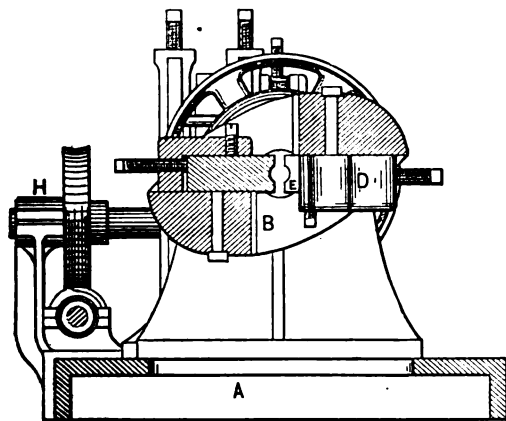


Fig. 3.—Sectional End Elevation.

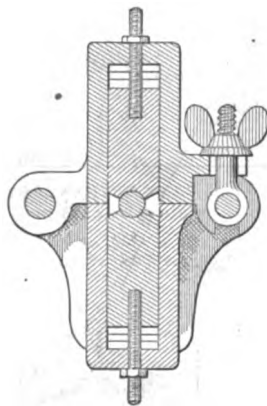


Fig. 4.—Cross Section of Polisher.

ROTARY SHAFT STRAIGHTENING AND POLISHING MACHINE.

of the pulley *f*. From Fig. 4 it will be seen that it consists of two hinged parts, which contain the polishing blocks, rubber cushions and metal followers. The polishing blocks are made of wood with the grain parallel to the axis of the polisher, and can be adjusted by means of nuts and screw bolts inserted in their outer ends. They are also to some extent, self-adjusting, by means of the rubber cushions just mentioned. When the hinged parts are closed the inner ends of the polishing blocks are brought to bear against the shaft to be polished. The two parts are locked by means of a hinged pin and thumb-nut, as shown in the cross section.

There are three sets of friction wheels, G, which perform the offices of feed rolls, one of them being between the flyer and polisher, and the other two at the ends of the machine. They are rotated simultaneously by the gearing H, consisting of worms and worm-wheels. The shaft to be operated upon is fed in at the left, and passes out at the right. The flier and polisher are rotated independently of each other, the directions being reversed in order to lessen the tendency of the shaft to turn or twist, and the rate of speed of the former, moreover, being much higher than that of the latter. Both, however, are exactly in line. The work of the machines, we understand, is highly satisfactory.

Italian engineers, we find it stated, have made use of a new principle for the propulsion of some of their fast gunboats and

torpedo catchers under construction. They have improved upon the twin screws of modern steamships by the addition of a third screw moved by a separate shaft and set of engines. The three screws are placed in the angles of a triangular pyramid. There is one on each side of the rudder, as usual, and the third is underneath, on a level with the keel-plate. It was claimed that the third screw increased the vessel's speed by fully a third, on account of the great gain in power from the deep immersion.

The Turner Steam Engine and Boiler.

Our English contemporary, *Industries*, devotes considerable space in a recent issue to illustrations and a description of a somewhat peculiar type of engine and boiler recently designed by Mr. Henry Turner, of Liverpool. The main feature of the engine is in the arrangement of the valves, by means of which the cylinders are used alternately for steam pressure, and for forcing air into the closed furnace of the boiler; and as the air is drawn round the tubes of a heater in the

can be constructed. Progress on the new engines was reported, and two of them are expected to be on the rails ready for work within 30 days.

Saint Catherine's Lighthouse.

Referring to the recent inauguration of Saint Catherine's Point Lighthouse, on the southernmost point of the Isle of Wight, the *London Engineer* gives an interesting description of the machinery and general equipment of this important station.

The electric light is employed, a power of 60,000 candles being obtained. Some idea of the power of this light will be conveyed to the reader when we say that the carbon pencils employed in the electric arc lamps commonly used for street lighting are about $\frac{3}{8}$ -inch thickness, while those which we are considering have a diameter of 60 mm., or nearly 2 $\frac{1}{2}$ inches. The lamp is of the modified Serrin-Berjot type, and the carbons, which are controlled by a duplex arrangement of spring and current, are not circular in section, but fluted, a valuable improvement introduced by Sir James Douglass, whereby the centrality of the arc is greatly promoted, the carbons are kept cooler, and a better supply of air to the lamp afforded. The 16-paneled dioptric apparatus is rotated, not by clockwork as usual, but by a small vertical engine worked by compressed air from below. As the time of rotation is of the utmost importance, a most ingenious regulator or governor is applied to the little engine which controls the speed by the automatic application of a brake should the motion become too rapid. Three compound engines furnish power, two of them being designed for driving the dynamos, while the third is used for compressing air for the fog-horn. Only one dynamo and engine are used for the light, the other set being held in reserve in case of accident. The two dynamos were built by De Meritens, of Paris, and the induction arrangement of each consists of 60 permanent magnets. We may add that the Saint Catherine light is at present the most powerful electric light in the world.

The Lubrication of Gas Engines.—

Gas engines are generally lubricated too abundantly, especially if it be necessary for the attendant to leave the engine for some time without supervision, in which case he prefers to arrange for an excessive supply of oil rather than run the risk of a break down, owing to insufficient lubrication. In consequence of this circumstance it becomes a matter of some importance to be able to use the oil which has once done service over again, and it is therefore of interest to note that a special apparatus has recently been brought out in Paris by M. E. Ducretet, of 75 Rue Claude Bernard, for filtering the oil as it comes from the cylinder. An engraving which is given of the device in one of our foreign exchanges shows the device placed around the exhaust-pipe of the engine, so that the heat of the escaping gases is utilized to raise the temperature of the oil under treatment, in this way greatly facilitating the process. The filter itself is contained within a vessel coated on the outside with some non-conducting covering, and consists of a cylindrical vessel having a loose cover, which can be screwed down by suitably arranged thumb-nuts, so as to compress more or less the filtering medium, which is generally composed of compressed cotton. Above the filtering medium is a series of perforated plates which retain the grosser impurities. The filtered oil can be drawn off at the bottom through a cup, and, we understand, has been found very satisfactory for further service. We are told that one of these filters has been in constant use in Paris for several months past with eminently satisfactory results.

At the recent annual meeting of the Strong Locomotive Company a contract was signed for the erection of extensive works, with special machinery for turning out one of their improved boilers per day, the works to be completed within six months from the date of contract. With these special tools the management claim they can turn out boilers as cheap per pound as the ordinary locomotive boiler

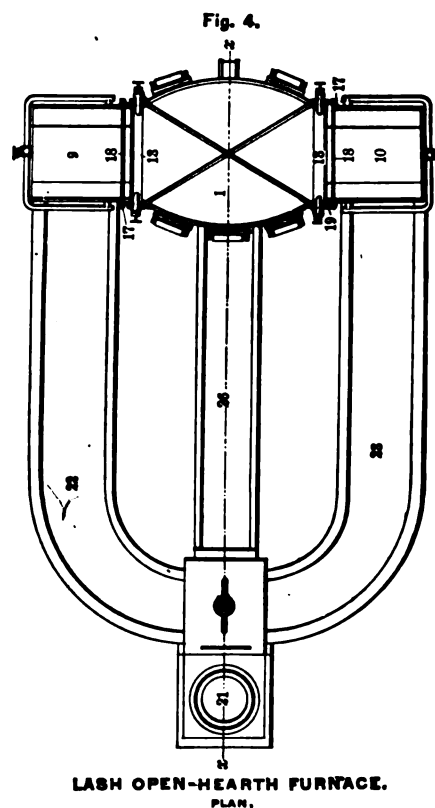
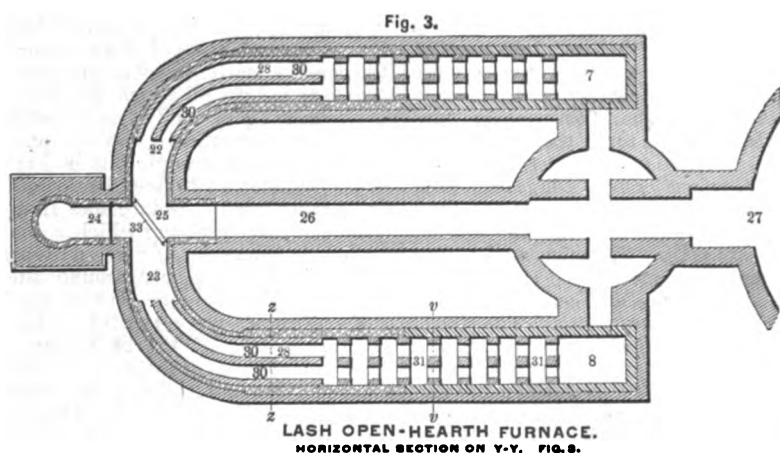
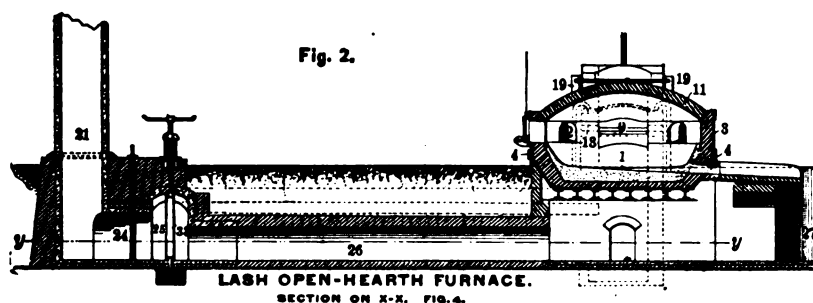
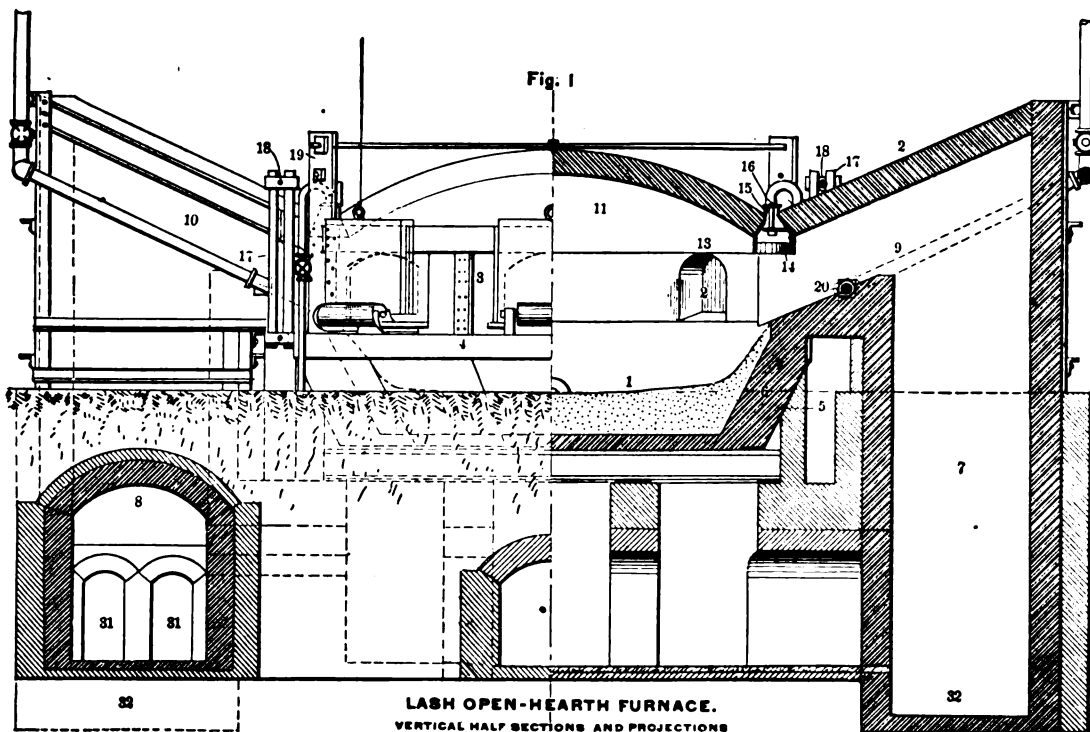
The Lash Open-Hearth Furnaces.*

BY ALFRED E. HUNT.

One of the chief defects of the original open-hearth furnace was that a large portion of the superincumbent weight of the

hearth in a plate-iron shell. This shell is carried on iron beams extending completely across the furnace and resting upon exterior walls or columns which are independent of the more highly heated and perishable parts of the furnace underneath.

the pipe are incased in the brickwork and open into the flats of each end of the furnace from the opposite side walls by leaving out the space of a header in the fire-brick at the ends of the pipe. This gaseous fuel is not diluted to fully 60 per cent. of its entire bulk with inert nitrogen, as is

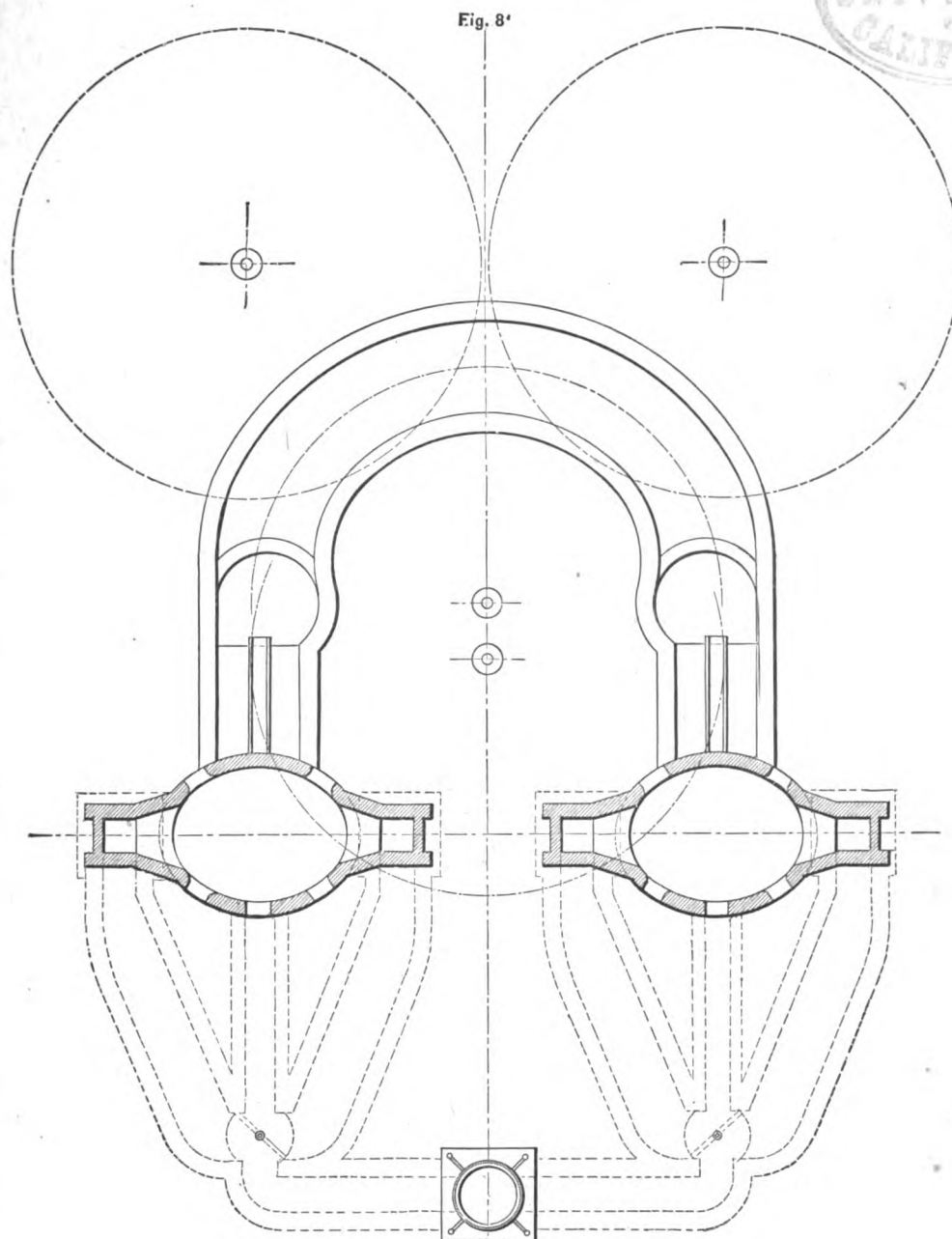


furnace and its charge was supported by the brick walls, between the gas and air regenerators, which were at the upper part of the regenerators, softened by being subjected often to intense heat on both sides. This fault is obviated in nearly all of the newer designed furnaces by incasing the

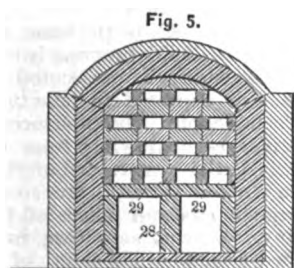
Natural gas, in the favored regions, has been a great boon to the open-hearth steel manager; he no longer has to spend a very valuable portion of his time "poking the gas man to poke his fires." The gas is carried to the furnace in an even flow through a 3-inch gas-pipe, which branches off to both ends of the furnace in 2-inch pipes. The delivery and reversing of the gas is regulated by ordinary globe gas valves placed in the circuit. The ends of

Siemens gas, which has to be conducted in pipes of 4 feet diameter to one of the furnace gas regenerators to be preheated. Natural gas is conducted directly to the ports of the furnace, as it was found that preheating decomposed it and soon filled the checker work of the gas regenerators with deposited carbon. The use of cold gas is much more than compensated for in the heat produced by the combustion of the concentrated fuel and by avoid

* From a paper entitled "Some Recent Improvements in Open-Hearth Steel Practice," read at the Boston meeting of the American Institute of Mining Engineers.

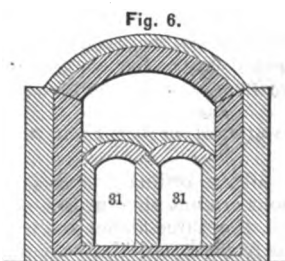


PLAN OF OPEN-HEARTH, TWO-FURNACE PLANT.

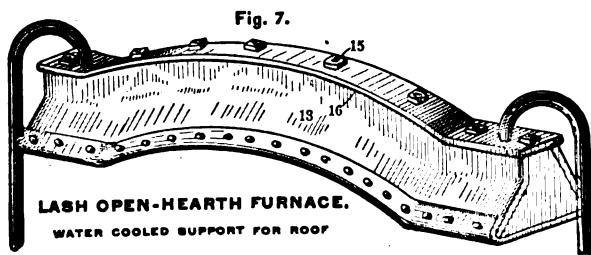


SECTION ON Z-Z, FIG. 3.

LASH OPEN-HEARTH FURNACE.



SECTION ON V-V, FIG. 3.

LASH OPEN-HEARTH FURNACE.
WATER COOLED SUPPORT FOR ROOF

ing the large amount of nitrogen which is present in Siemens gas. Natural gas melting furnaces are now built so that both of the regenerators at each end of the furnace are connected with the air inlet valve, or they are built with only one regenerator at

each end of the furnace for preheating the air. In this case the air valve and air regenerators are built larger, with 60 per cent. greater capacity than when using Siemens gas. Natural gas is supplied in the service mains to melting furnaces in

the vicinity of Pittsburgh with a pressure of about 8 ounces, and this pressure is adjusted in the service-pipes by regulators ordinarily furnished to the plants by the natural gas companies, and which they place with their connection to their mains at some suitable point about the plant. The pressure, as regulated by the valves at the large sized Lash furnaces, is at present only about 1 ounce or $1\frac{1}{4}$ inches of water pressure as the gas goes into the melting furnace. The lighter the pressure, so long as the flow is kept uniform and steady, the better the combustion, and the more intense the heat. The steady uniform flow of natural gas has made it peculiarly applicable as a fuel for melting in open-hearth furnaces and has been a very potent cause of the growing reputation for regularity and uniformity, as well as for superiority in other ways, of the open-hearth steel made in the natural gas districts.

The tendency up to within the past year has been to increase the size and capacity of open-hearth steel furnaces, and the newer furnaces have been of 30 and 40 tons capacity instead of 5 and 7 tons as were those built at first. Except for special purposes, where large steel castings are to be made, the writer believes the limit of size has been reached. Experience with the large furnaces has led to the growing conviction at present that fur-

naces of about 15 to 20 tons at the maximum, are the most economical and produce the best steel.

The latest improved Lash open-hearth furnace plant the writer believes to be the best yet devised. It is peculiarly adapted to the use of natural gas, and there are, at the present writing, 12 furnaces now erected in Pittsburgh on the Lash system, four of 40 tons, five of 30 tons, one of 20 tons and two of 15 tons, and there are four 15-ton furnace buildings. See Figs. 1, 2, 3, 4, 5, 6 and 7, in which the parts are numbered for reference.

The hearth of the furnace (1) is made circular or, preferably, elliptical with major axis of 18 feet of hearth inside the linings and minor axis of 15 feet for a 15-ton furnace. This hearth is supported on beams resting on suitable walls or piers of such a height that the charging-doors are accessible from the ground level. The retaining shell of $\frac{1}{4}$ inch thick steel plates extends from the top of the side walls down to a broad connecting band (4) a short distance below the charging-doors; from this, the shell slopes inward to the bottom plates of the hearth. The lining of the hearth conforms to the shape of the shell, and since the bottom plates and supporting beams prevent any vertical movement downward, the conical shape of the outer walls of the lower portion of the melting chamber prevents almost all of the outward movement due to the expansion of the lining, thus preventing the rupture of the lower side-walls of the furnace.

The single flues (9) in natural gas furnaces at either end of the melting chamber are 5 feet wide and are simply large passages inclined down toward the bath at a pitch of about 4 inches to the foot, to give the flame a strong guide downward upon the metal. In order to provide a firm support for the arched roofs of the melting chamber and flues leading into it, a water-bosh, Fig. 7, made of $\frac{1}{4}$ -inch thick steel plate, is put in the form of a keystone in the arch of each roof, that of the melting chamber (15) and that over the downtake flues (2) butting against the plates of the inclined sides of the water-bosh, which in this way acts as a double skew-back or keystone. This bosh is 1 foot wide at the bottom and 5 feet long. It is stayed inside at proper intervals by transverse bars, and, although exposed on its under side to the intense heat of perhaps 3000° F. of the flue leading directly from the melting chamber, is found to work admirably; the writer has seen the under side of one of these water skew-backs after being in service for several months and having made over 100 heats in the furnace, which has stood perfectly, the scale being hardly detached from the surface of the metal. These water skew-backs are provided with 1-inch pipes (16) feeding water at 5 pounds pressure and leading out the waste water which is hardly lukewarm.

The side walls of the flues are held in place by suitable plates, angles and back-stays (16, 17, 19) and the outer walls of the furnace are also stayed from opposite sides by means of plates reaching upward from the surrounding bands of the melting chamber and diagonal rods (18). Natural gas is led into the sloping flues by wrought-iron pipes (10-17) which enter the brickwork near the "four corners" of the melting chamber. The gas being much lighter than the air, mixes with it in its downward rush into the furnace.

The stack (21) is placed in such a manner that the flues leading from each end of the hearth (22-23), which have checker-work in them, alternately act as regenerators to preheat the air before it enters the furnace. The lower end of the stack is connected by a short flue (24) with a four-way chamber (25), to which the flues (22-23) from each end of the furnace con-

verge and to which the air-duct (26) delivers. This air-duct (26) leads out from the ladle-pit (27) and passes directly under the hearth in this way, not only heating the air, but giving a free circulation under the hearth and preventing an excessive heating of the bottom. Along the middle of the flues (22-23) leading from the central four-way chamber (25) to the opposite ends of the furnace is placed checker-work of fire-brick supported on tiles (28), so that the bottoms of the flues are clear openings (29), giving a stronger draft; but as there is a constant tendency of the heated air to ascend there is a thoroughly uniform heating of the air entering the furnace by this arrangement.

The front portions of the flues are provided with a series of double arches, which not only serve to strengthen the side walls and tops of the flues, but also to increase the heating surfaces. The up-takes (7) are extended down below the points of entrance of the chimney flues, in this manner forming pockets (32) for the reception of any cinder, dust or other matter that may be drawn over from the furnace-chamber and preventing this material from going forward toward the stack and clogging the checker-work (31) in the chimney flues (22-23). Suitable openings are provided in the brick work, so that by taking down the brick bulk-heads these cinder-pockets may be easily opened and cleaned out.

The four-way chamber (25) has the air-duct (26) leading into it permanently open, and is fitted with a three-way valve (33) alternately connecting the flues (22-23) leading to each end of the furnace with the chimney (21) and with this air-chamber (25), in this way reversing the furnace on the well-known Siemens principle. This three-way valve (33) is hollow and is kept cold by a stream of water running through it, preventing the warping or burning out of the valve, or with Siemens gas furnace, the direct loss of fuel by leakage to the chimney.

The tap-hole of the melting furnace (34) is at about the ground level, and the metal is conducted through an inclined spout (35) some 10 feet in length to the ladle-pit (27). The ladle, after being filled, is lifted by a crane and transported to an auxiliary semicircular casting pit, only about 4 feet lower than the ground-level in which the ingot molds are set. The front of the furnace is provided with three cranes, so located that they cover the entire pit space, the ladle and ladle-pit and the furnace melting-chamber, so that if a movable roof be put on the furnaces, large pieces may be swung in on to the furnace hearth.

The great advantages of the Lash furnaces are:

1. They have all the ordinary and important operations around the furnace on one ground-level, the three doors on the back side of the furnace and the two on the front or tapping side being all accessible for charging or for repairs to the furnace. A record of 500 consecutive heats, of 50,000 pounds of stock each, shows that these were charged in an average of 24 minutes per charge, 12 men, or all hands about the furnace, doing the charging from all five doors which are balanced and arranged to open by levers in the pulpit under the control of the crane boy.

2. The ladle and the tap-hole are easily accessible from the ground-level, thus avoiding all swinging platforms and stages.

3. The gas and air-flues are so arranged as to be entirely isolated from the melting chamber and hearth except where the flues enter the furnace, thus doing away with the necessity of thick brick walls which are subjected to heat on both sides; the masonry being of uniform thickness

throughout much unequal expansion and bulging is prevented.

4. The chimney flues, regenerators, three-way valve and ladle-pit are all on one level, about 10 feet below the ground level, and easy of access for repairs.

5. The free access of air all around the flues and furnace-chamber prevents their being unduly heated at any time.

A Lash open-hearth plant is now being built by the Wetherell Bros. Steel Casting Company, at Thurlow, Pa., for the use of producer gas, with modifications necessary for the double sets of flues and checker-work to preheat the gaseous fuel as well as the air and double sets of ports, and the air over the gas for their entrance into the furnace. There seems to be no reason why the Lash system of furnaces, suitably modified, will not be equally advantageous for producer gas as for natural gas.

The rapidity with which repairs have been made upon Lash furnaces is one of the most important of their advantages. In two weeks' time, from heat to heat, a 30-ton furnace was repaired, the bottom taken out and the brick-work, from the ground level up, put in entirely new, with seven masons working on day turn, without any night work except in tearing out the brick-work, and in the five days making bottom and reheating.

Thirty-ton furnaces have been shut down and cooled off after the heat on Saturday, the furnace allowed to cool on Sunday, the roof and side walls torn out on Monday, the brick relaid on Tuesday and Tuesday night, gas turned on Wednesday morning, and the furnace charged, with good results, by Thursday noon. That is, a rebuilding of the lining of the entire melting chamber from the hearth up, and of the side walls of the flues leading to the down-takes, with a loss of time of only five days from heat to heat.

The Corinth Canal.—A letter from Corinth, Greece, gives a detailed account of the progress of the ship canal being constructed through the Isthmus at that point by a French company, who have received liberal concessions of land from the Government, accompanied with a proviso that there shall never be any claim for a subsidy in behalf of the constructors. The canal will measure 6300 m. from sea to sea, with a width of 40 m., and will be excavated to the depth of 8 m. below the sea level, mostly through solid rock, and the expenditure will be \$6,000,000. The depth of water will be the same as in the Suez Canal. Rapid progress is making in the work, which is prosecuted by 2800 men, and is expected to take three years for its completion. The appliances include 15 engines, each drawing from 60 to 70 trucks. At the western end of the canal, on the Gulf of Corinth, are situated all the large depots and offices of the canal company. Here a new town is growing up called Isthmia. The depth of water a short distance from the shore is 30 fathoms. The sides of the canal will be solid granite, and there will be no washing away or necessity of dredging. The largest docks will be at the eastern end. The tariff of the canal will be put down to a low figure, so as to catch all the coasting trade, and it is fully expected that, in spite of the great expense of the work, it will pay well in the end.

A new gas engine, known as the Sturgeon engine, has just been brought out in England by a Manchester firm, Messrs. H. Wallwork & Co. It is a beam engine of the compression type, and of that order which works by combustion under constant volume. An impulse is received at every revolution. Illustrations explaining the construction and the functions of the different parts were published in the *London Engineer* of June 15, 1888.

The Iowa Railroad Problem.

Iowa has set the example to the other States of attempting to correct by local legislation the effect upon local jobbers and manufacturers of the operations of the Interstate Commerce act. For this reason the experience which the people of the State are acquiring in the matter of regulating railroad charges is well worthy of wide consideration. Thus far their efforts have been attended with partial failure. Notwithstanding the heavy reductions made by the Railroad Commissioners of the State, shippers are already beginning to complain of the new tariff rates, on the ground that they give no relief to jobbers and manufacturers, in that the local rates prevent doing business against Interstate rates. For instance, on fifth-class freight the manufacturer, 50 miles from Illinois, ships in material at 7 cents per 100 pounds, and ships it out to a customer 50 miles distant at the same rate. That would be \$42 for the carload of 30,000 pounds. Now the Eastern manufacturer can ship the same freight to the same destination under Interstate rates for 8.4 cents per 100 pounds, or \$25.20 per car, a discrimination of \$16.80 per car—or, in other words, the Iowa manufacturer or jobber pays the railroad company \$16 per car more than the Eastern manufacturer for the same service, except perhaps the mere switching of the car to Iowa manufacturers' warehouse. If this discrepancy runs through the several classes, the jobbers and manufacturers of Iowa have not gained much by the maximum tariff law. Their next objective point will be the Interstate Commission and the Iowa Commissioners for an adjustment of rates. The Burlington, Cedar Rapids and Northern Road, which is an all Iowa road of the B-class, has decided to go to Illinois for its coal. It has heretofore received its supply from What Cheer mines, but under the new tariff law it can go to Illinois, a much greater distance, and get it at less cost.

Mr. Ives, of the Burlington and Cedar Rapids road, has put the following conundrum to the Railroad Commission: Can a B-class road make a tariff beginning 15 cents higher (as entitled under the rule) than for an A-class road and run down to A-Class road figures after the first 100 miles? How shall figures be adjusted in making joint tariffs between roads of different classes? Can the short rates for different classes be aggregated, or shall the joint tariff represent a long haul by adding the distances and making rates accordingly? The Commissioners will be kept busy with problems of like nature for a time. So unsatisfactory to the railroad companies are the rates made by the Commissioners that they are appealing to the courts for their interference. On the 28th ult. the Commissioners were served with a temporary injunction by Judge Brewer, of the United States Circuit Court, at St. Paul, enjoining them from putting into force the new schedule of freight rates on Iowa roads. The notice requires them to appear before him at Leavenworth, Kan., July 5 and show cause why they should not be permanently enjoined from issuing such a schedule. The petitioners in this case were the Chicago and Northwestern road, the Chicago, Burlington and Quincy road and the Chicago, Milwaukee and St. Paul road. Judge Brewer gave them a hearing at St. Paul, Justice Miller, of the United States Supreme Court, also being present. The counsel for the roads say that the new schedule would ruin their business; that they have got to fight in the courts and the sooner they begin the better it will be for all concerned.

On the 29th ult. the Railroad Commissioners were served with an injunction,

issued by Judge S. H. Fairall, of the District Court of Johnson County, Iowa, restraining them from promulgating the new schedule of rates. This is additional to the injunction issued by Judge Brewer of the United States Circuit Court, but is based on substantially the same ground. The petitioners in this case are the Chicago, Rock Island and Pacific Road and the Burlington, Cedar Rapids and Northern Road. Both of these companies are incorporated under the laws of Iowa, hence they seek relief through the State Courts. The principal reason given in the application for an injunction is that the proposed schedule is not a "reasonable" rate, as required by law, but is so unreasonable and severe as to cause the roads to do business at a loss if it is put in force. Comparisons of rates with those in other States are set out, showing that the Iowa rate is lower than all. It is understood that all the Iowa roads, including the trunk lines crossing the State, have agreed to pool their issues, and make a common test of the case in the courts.

NEW PUBLICATIONS.

A MANUAL OF STEAM BOILERS: THEIR DESIGN, CONSTRUCTION AND OPERATION. By R. H. Thurston. Size 6 x 9½ inches; 671 pages. Published by John Wiley & Sons. Price, \$6.

In preparing the above work, Professor Thurston followed the double purpose of supplying a book which would, in a measure, meet the wants of the designer, builder, and the manager of steam boilers, and at the same time admit of being advantageously used as a text-book in engineering schools. On the whole, he has been eminently successful; in fact, there is, we believe, at present, no other work which is so well, if indeed at all, adapted to these ends, and student and engineer alike will find it a valuable guide and counsel. The opening chapter gives a very interesting historical account of the steam boiler, and is followed by considerations of the materials employed in its construction, their physical and chemical characteristics, methods of testing calculations of strength of different forms of boilers and allied subjects, fuels and their combustion are then taken up, and are followed very appropriately by a chapter on heat, its production, measurement and transfer. Obviously a good deal of old ground is gone over in dispensing of these subjects; still this is essential to the thorough treatment which Professor Thurston follows, and the reader will scarcely find reason to complain of the space thus taken up. What may be considered the subject matter proper, is reached in Chapter VII, entitled "The Design of the Steam Boiler." The various items involved are here taken up one after the other, and examples from practice are introduced to illustrate the proportions of different parts of boilers of several types. The design of the plain cylindrical boiler is the simplest problem of its class, and is, therefore, considered first. Then come stationary and marine single and multifue and tubular boilers, sectional and water-tube, upright and portable, and finally locomotive boilers. The specifications which are given are necessarily brief, but cover the principal points and afford an idea of what is to be taken into account in the work. The accessories, such as the setting and chimneys, are treated of in another chapter. Following this is the construction of steam boilers. Under this head the author describes the methods and processes employed, the tools and machinery necessary and the work of construction proper. Specifications and contracts make up an interesting and instructive chapter. Sample specifications are given for a horizontal tubular boiler, a flue boiler and one of the sectional type,

and two dimension specifications are added of boilers and locomotives as issued by the Pennsylvania Railway motive power department. For the benefit of boiler attendants Professor Thurston has here incorporated, also, some good advice on the care and management of boilers. Under the head of "Steam Boiler Trials," the instructions and rules governing the standard system, prepared several years ago by a committee of the American Society of Mechanical Engineers, are reprinted.

The concluding chapter is devoted to steam boiler explosions, and with some modifications was published as a separate volume last year, a review of it having appeared in our columns at the time. An appendix, containing tables relating to steam and water, is also added. The plan of the work is well arranged, and, in the main, admirably executed, and we are confident that the book will be warmly welcomed by the engineering profession.

USES OF BELTING. By John H. Cooper. Illustrated. Size, 6 x 9½ inches. 390 pages. Published by Edward Meeks. Price, \$3.50.

As Mr. Cooper's book has reached its third edition we need not consider it as an entire stranger, its general character being no doubt familiar to a large number of readers. The principal feature of the new issue consists in the addition of several foreign articles on belting, and extensive reference to contributions which have been made to engineering societies, the collection of practical data from different sources also having been enlarged. It may be well to briefly repeat here that the book is virtually a compilation of facts and figures, a circumstance which is apparent at a glance, the author himself having in the main performed simply the work of editing the several parts and properly classifying them. Mr. Cooper, in fact, explains that his work, arising originally from a desire to know about belting for shop use, has been that of collecting, condensing and comparing existing published data and rules. To these have been added examples of belts in use, with the object of showing how closely their performance corresponds to the rules which are given for such cases. The reader must, however, be prepared to find considerable divergencies in the results which are given by following several formula supposed to yield practically identical figures. Those who have endeavored to secure a convenient formula for belt powers and widths under known conditions by consulting different authorities have, we believe, invariably encountered these amazing discrepancies, and Mr. Cooper's book, for obvious reasons, can prove no exception. But the information which it contains is nevertheless of much value, presenting, at least, data derived from cases in practice.

English Cruisers.—Several of our English contemporaries are complaining that some of the recently designed fast cruisers for the British Navy are not at all what the name implies, having been designed for a speed of not more than 16½ knots, under forced draft. The proposed vessels, six in number, will be built of steel, and will be 230 feet long and 35 feet wide. Each will have a displacement of 1580 tons and be fitted with triple-expansion engines, estimated to develop 8000 horse-power, also under forced draft. The armament is to consist of quick-firing and machine guns, together with torpedo tubes. It is not stated whether the speed will be that developed during the official trials, or that which can be counted on in regular every-day work, but, in any event, it is interesting to note that the latest developments in the designs for the English navy will not be remarkable for the high speeds with which they are ordinarily credited.

Segment Re-sawing Machine.

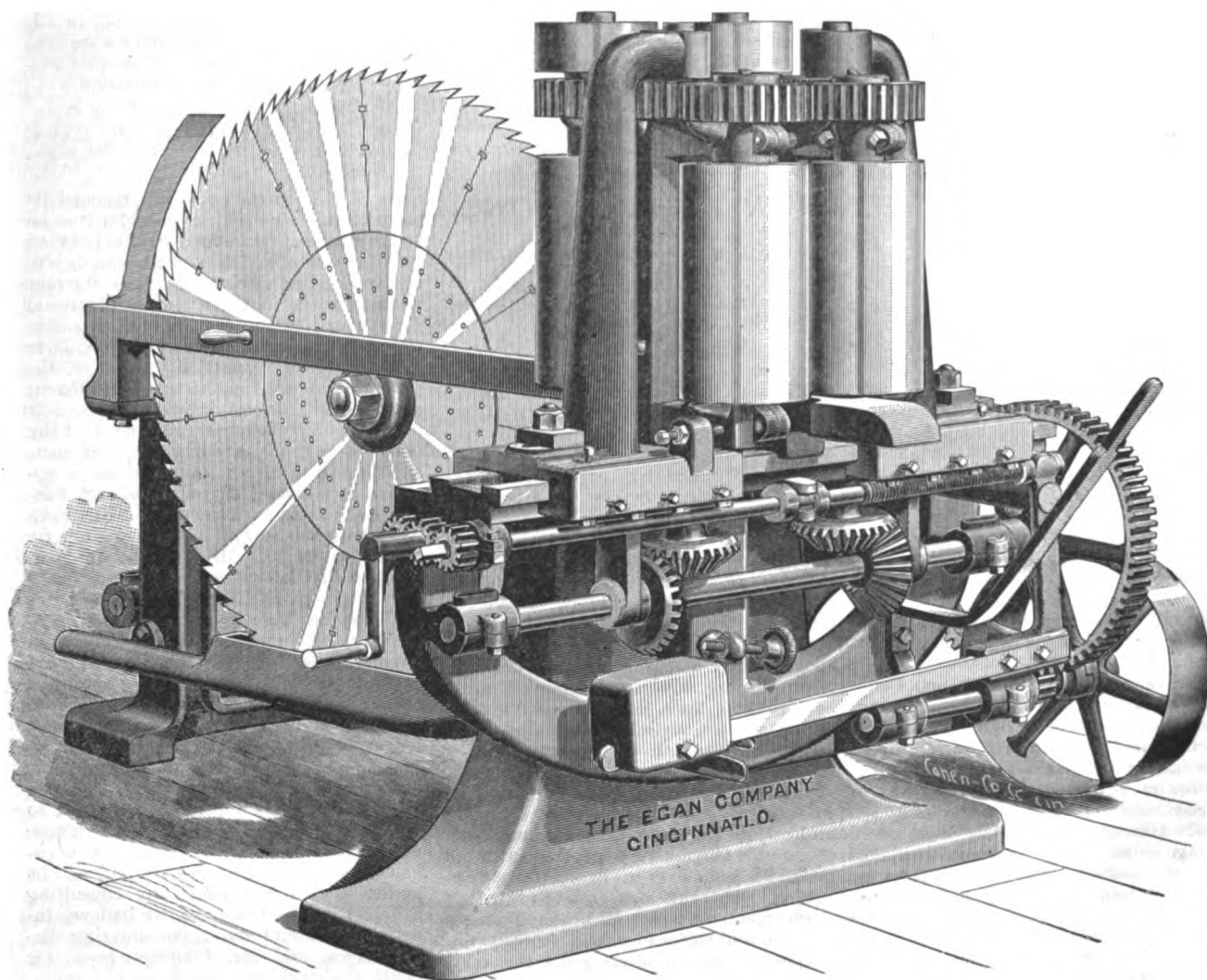
We illustrate on this page a new circular re-saw with segment blades, for use where a great deal of work is wanted with the least waste in kerf. The saw is manufactured by the Egan Company, Cincinnati. It can be used to great advantage for all kinds of splitting in car works, box factories, planings mills, furniture and piano factories who desire to hold their lumber well up to size. The segment blade takes out but little kerf, is easily kept in order, and both the quantity and quality of work are all that can be desired. The frame is very heavy and substantial, and is placed

best crucible steel of large diameter, running in self-oiling boxes; the pulley on mandrel is placed between bearings, which are adjustable, and slide on planed ways to and from the feed rolls to accommodate any size saw, and to bring the teeth of the saw close up to the feed rolls.

The New English Magazine Arm.

The following particulars connected with the proposed new magazine gun for the British army will doubtless be interesting to many. The bore is 0.303 inches diameter giving about 33 per cent. more

magazine. One magazine is attached by a chain to the rifle, so as to secure its retention. Subsequent magazines may be discharged and thrown away, if necessary, in the full heat of action, for in the continued use of magazines we are contemplating a time of supreme stress and importance. The attached magazine contains eight rounds, those subsequently used six rounds each. At present the infantry soldier will carry one or two spare magazines; thus, with the first one, he is furnished with a reserve of 14 or 20 rounds for rapid discharge, according to whether he has one or two spare magazines. Cavalry and mounted infantry could carry bandoliers



NEW SEGMENT RE-SAWING MACHINE, BUILT BY THE EGAN COMPANY, CINCINNATI.

perfectly true to receive the swinging feed roll frame and mandrel boxes. The feed consists of four heavily geared feeding rolls, with front top rolls for straightening wide boards. The frame which carries the feeding rolls is pivoted on the main frame in such a manner that all four rolls can be adjusted to any angle at once by loosening one hand-lock nut; the setting and angling is done by an adjusting screw to facilitate accuracy in adjusting the rolls to any desired angle. The rolls are self-centering—that is, a board 1 inch thick may be followed by one $1\frac{1}{4}$ inches thick, and both may be split in the center, or either pair of rolls on either side of the saw may be made rigid by loosening one hand nut, so that slabs of any desired thickness may be cut from a plank. The rolls come within $\frac{1}{8}$ inch of the bed plate, allowing strips $\frac{1}{8}$ inch thick to be split if necessary, which is an advantage not possessed by many other machines. The mandrel is of the

same weight of ammunition. It has a detachable magazine. Experiments with the Martini-Henry, with a rifle with a fixed magazine, and also one with a detachable magazine, have shown that the last has a great advantage, arising from the circumstance that when a magazine is empty another filled magazine can be put in its place in the same time that it takes to get a cartridge out of the pouch and load with it. Thus the soldier is able to keep his attention directed almost wholly at the object at which he is firing, so long as his supply of magazines lasts. In a fixed magazine the advantage of rapidity is confined to the number of rounds supplied by the single magazine. When they are discharged the rifle is simply a breech-loader until a suitable opportunity arises for recharging the magazine, unless some special charging gear is applied which approaches in degree the conditions of a detachable

with eight or ten detachable magazines. Three hundred and fifty rifles are ready for the troops.

The extensive improvements which have been in progress for nearly a year in South Brooklyn, better known as Gowanus Bay, will soon convert that section into a valuable warehouse and dock property, with railway and other terminal facilities. The New York and South Brooklyn Ferry Company and the South Brooklyn Railroad and Terminal Company are virtually a single organization, all the parties concerned being united in a common interest, and by whom the extensive water front between Twenty-eighth and Thirty-ninth streets is being improved, on the line of Second avenue. The west side of this avenue will be occupied by warehouses. The expenditure in the development of this enterprise is \$3,000,000 during this year alone.

THE WEEK.

Nearly all the grain storage capacity in Brooklyn has come into control of a new organization called the Brooklyn Warehouse Company, Edward Annan being president. More exactly stated, the number of stores in the combination is 134, and the aggregate capacity is 20,000,000 bushels. This result is attributed to the new elevator law, which, it is alleged, compels warehousemen to combine for common defense.

The spread of population into the annexed district above the Harlem continues with little abatement. Four lines of railway traverse the district, affording quick communication with the business portion of the city, and a line of the Suburban Rapid Transit Elevated Railroad is being pushed beyond One Hundred and Sixty-sixth street. The Manhattan Elevated Railway Company is building a grand terminal station for its east side lines near that point, between Second and Third avenues. The main line of development is along the Harlem River and the new railways, but there are broad and attractive districts between them and over eastward toward Long Island Sound about Hunt's Point, on the line of the New York, New Haven and Hartford Road and along the line of the old Boston post road, which has been widened and graded from One Hundred and Sixty-fifth street to Bronx Park. Altogether the district is capable of supporting a population of several millions, and it is growing at a promising rate.

Is the milling center moving back to the East? This question is discussed affirmatively by a writer who assumes to speak from a knowledge of the facts, representing that Minneapolis has already reached its zenith; that the building of big mills west of Chicago has ended and that Buffalo and other Eastern points have the advantage of location. He says: "The milling center has been forced too far West, and, beyond its natural and hence permanent limits by artificial means—chief of which have been lower through rates of freight the further West the miller has gone, and, next 'milling in transit,' by which the Northwest has had an advantage over the rest of the country, both in selling its flour and in buying its wheat. Hence the rapid growth of Minneapolis as the milling center of the country and of the Northwest, aided by its superior water power. But that point has now outgrown the advantages by which its supremacy was secured."

Santiago de Cuba has been placed in telegraphic communication with ports in Hayti and Venezuela.

Owing to rivalries between express and railroad companies, freight charges on merchandise shipped from Eastern points to Chicago have been cut recklessly. In some instances through-bound Western freights have been carried by express as low as 90 cents per 100 pounds to Chicago and other Western points, and many contracts, some for two and three years and even a longer period, are said to have been made for prices ranging from \$1 to \$1.50, and they are still in existence. Efforts are now making to come to an agreement.

The new timber raft or "ship," as the contractor insists upon calling it, will sail from Nova Scotia for New York some time during the present month. It is like a huge cigar in shape, is 800 feet long, 53 feet in breadth at the widest part, 38 feet high in the center, and draws 22 feet of water. It will contain when completed 22,000 logs, averaging 38 feet in length, 11½ inches in diameter at the butt, running to 6 inches at the top end. The

whole big mass is to be bound together by 33 tons of chain, a large quantity of steel wire also being utilized. The raft is valued at \$33,000.

The customs receipts at the port of Montreal for the fiscal year ending June 30 were \$7,720,998, as compared with \$8,874,147 the previous year, showing a decrease for this year of \$1,153,149.

Three laborers were imprisoned all day in a caisson sunk 80 feet deep in the river near Council Bluffs, where a bridge to Omaha is building, and one of them was completely paralyzed. One of the doors of the air locks, through which the men pass, had become clogged with concrete, and when they attempted to return the door could not be opened. An extra door had to be built to cover the shaft before they could be released.

The Philadelphia Manual Training School held its first annual commencement exercises last week, and about 60 pupils received their diplomas. Prof. Wm. L. Sayre, the principal, presided. Superintendent MacAlister in an address, said: "What the Manual Training School means for every boy is an education broader, more comprehensive, more humane, more elevating than any heretofore offered in the history of the world. For years the world has been moving in this direction, for making education more human, more in the direction of training, and fitting boys to enter well prepared into the battle of life. It is a school which seeks to strengthen the intellectual culture of its pupils. The boy, in place of feeling with mere abstraction, with mere words, comes into contact with things, with this great, real universe in which we all live, and, therefore, his intellectual thought is most profound, his thought is more real to him."

A gigantic scheme has been proposed, by which the canons of the Rocky Mountains are to be dammed up from the Canadian boundary to Mexico, in order to form vast reservoirs of water to be used in the irrigation of arid lands, and so prevent floods in the lower Mississippi. Major Powell, director of the National Survey, estimates that at least 150,000 square miles of land might thus be reclaimed—a territory exceeding in extent one-half of the land now cultivated in the United States. The plan is to build dams across all the canons in the mountains large enough and strong enough to hold back the floods from heavy rains and melting snows, and then let the water down as it may be needed upon the land to be reclaimed.

There being some prospect of a profitable trade in the exportation of live cattle from the Hawaiian Islands, the United States revenue officers decide that cattle may be admitted for immediate slaughter without undergoing quarantine.

Three million feet of gas is the lowest estimate of the flow of natural gas every 24 hours from the well just finished at Sparta, Ill. The escape is attended by a roar that can be heard at Marissa, 10 miles away, and in the immediate vicinity the force exerted gives the earth a vibration similar to that noticeable in a factory building when the machinery is in motion. How to derive practical benefit from the well has not yet been decided.

Edison is having talks in England through his perfected phonograph "in his own familiar and unmistakable tones," although more than 3000 miles away from his auditors. He proposes to mail phonograms daily, deriving an advantage therefrom as compared with a style of writing not always legible.

The corner stone of the new United States Trust Company's building, which promises to be one of the finest of the

down-town business edifices, was laid in the massive foundations at 43 and 45 Wall street, under the auspices of the building committee of the company. A large leaden box, containing coins and newspapers of current date, was plastered in the stone with appropriate ceremonies. The building is to be nine stories high, and will have a frontage on Wall street of over 50 feet. It will be of the Romanesque style of architecture, and will be principally built of a heavy rock-faced pink Massachusetts granite and Long-meadow brown-stone. The banking room of the company, on the ground floor, will be 21 feet high and trimmed throughout with marble. It will be furnished with all the modern conveniences, and a new system of ventilation invented by R. W. Gibson, the architect of the building. The estimated cost of ground and building is \$1,700,000. D. H. King, Jr., is the builder. It will be ready for occupancy on May 1, 1889.

A case of alleged conspiracy on the part of employers grew out of the shoemakers' strike in Weymouth, Mass., and Judge Pratt, of the District Court in Quincy, has announced his decision. The complainant was Thos. Williams, a workman who left the shoe factory of John Carroll, on strike, after his demands for higher wages had been refused. He then entered the employment of another firm, but being discharged on account of the previous difficulty Williams sued Carroll, claiming damages for conspiracy to prevent his earning a living. It was admitted by defendant's counsel that the plaintiff was discharged in pursuance and in consequence of an agreement among the manufacturers. Judge Pratt said, in reviewing the testimony: "It seems to be the policy of our laws, and one in full consistency with the enlarged spirit and freedom of the present day, that every man has a right to determine what branch of business he will pursue, and to make his own contracts with whom he pleases, and on the best terms he can. He may refuse to deal with any man or class of men, and it is no crime for any number of persons, without an unlawful object in view, to associate themselves together and agree that they will not work for or deal with certain men, or classes of men, or work under a certain price, or without certain conditions. It seems to be well settled law that any workman, or body of workmen, may lawfully form and act as an association for the purpose of protecting themselves against the 'encroachments' of their employers. Applying the same course of reasoning to the present case, it would seem more than absurd to deny to employers at least the same rights of combination to protect themselves in a situation which combined labor has forced upon them. In the case on trial I find no evidence which shows, or even tends to show, any criminal, unlawful or improper combination on the part of the defendant with any man, or body of men, within the definition of the quoted authorities, and, therefore, order judgment for defendant."

A contract has been awarded to the Philadelphia Gas Improvement Company for supplying an amount of gas not exceeding 3,000,000 cubic feet per day, at 87 cents per 1000 feet. The company submitted four processes, and that known as the Hanlon & Leadley was selected. The company are required to erect without delay a plant that will cost \$275,000.

A source of wealth which Baltimore has very greatly expanded since 1880 is her manufacturing industry. In 1870 the whole State of Maryland had but 2759 manufacturing establishments, with \$26,049,040 of capital, 33,182 hands, and products worth \$59,219,933 in the inflated currency of that time. In 1880 Baltimore alone had 3683 establishments, with

\$38,586,773 of capital, 56,338 hands, and products worth \$78,517,304. Since 1880, however, Baltimore's industrial activity may be said to have taken fresh start. If there has been a loss to the city in certain branches of trade, as in coffee, sugar, cotton and tobacco, the loss has been more than made good by the gain in manufactures.

Claus Spreckels's sugar refinery now in course of construction in Philadelphia, will require 21,000,000 gallons of water a day for its refining processes, or about one-third of the daily consumption of the entire city. The filter house will measure 325 x 68 feet, and be eight stories in height.

A gas-holder of 4,000,000 gallons capacity, the largest ever made in this country, is being built by the Continental Iron Works for the Consolidated Gas Company. Its diameter is about 190 feet, and the tank beneath is 200 feet in diameter and 40 feet high. The guides are about 80 feet high. Altogether 2500 tons of iron are consumed in the construction.

The Underground Railway Company has in prospect a protracted legal contest before it can obtain right of way in the streets. The Commissioner of Public Works insists that the company has never been duly organized, is not acting in good faith, and has not complied with the terms of its charter.

The Attorney-General of this State heard arguments on May 14 in support of petitions in which he was urged to bring suit against the Sugar Refineries Company, commonly called the Sugar Trust, and against one of the corporations absorbed by that organization. He has now decided that it is important to ascertain by judicial investigation whether the allegations set forth in the petition are true. It is stated that application will at once be made to the Supreme Court for leave to bring an action in the name of the people against the North River Sugar Refining Company. The permission of the court is not required in the case of the Trust, and for that reason it is possible for the Attorney-General to proceed against the Trust without much delay.

The arrivals of vessels at this port during June, both foreign and coastwise, were smaller than during the month of June in several previous years. British foreign arrivals number 215 out of a total of 513 and as compared with 162 American. Of the aggregate 200 were steamships.

A steel freight boat was launched last week at the head of Lake Superior, for Captain McDougall, to be employed in the grain and coal trade. The captain's scheme is the very practical one of reducing insurance rates on vessel cargoes, as well as reducing the actual cost of transportation of wheat and coal on the great lakes and canals. The vessel is 187 feet in length over all, 25 feet in width and 18 feet in depth. She is flat-bottomed, tapering from the water to stem and stern. She has no machinery whatever, being simply a big steel boat. Her deck consists of nine steel hatches, guarded by a wire-rope fence.

The increase in the assessment of city real estate this year in San Francisco is \$16,000,000 over that of last year, while the increase of personal property assessments is \$2,500,000.

President Flores, of Ecuador, who is now visiting New York City, speaks extravagantly of the benefits to be derived by his country from the completion of the Panama Canal, which he is confident will take place not later than two years hence.

It is now fully a year since the Legislature of the State of Minnesota passed its law for the regulation of railways.

This law is similar in character to the Interstate Commerce law, differing therefrom only in that it provides for a Board of Commissioners who have the power to fix rates, and to take measures to compel the railroads to accept them. The Minnesota Commissioners hold that the courts have no jurisdiction over them, and that their rates must be enforced by the roads whether the latter consider them reasonable or unreasonable. This is substantially the position now occupied by the Iowa Commission.

Denver is about to have an astronomical observatory that will rival the famous Lick observatory in California. Its dome will rise from a plain and have 1000 feet greater elevation. The building and instrument have been provided for through the liberality of W. B. Chamberlain, of Denver. The framework of the metal dome is of iron and steel, and is made as light as is consistent with a high degree of rigidity. The covering is of galvanized iron. The weight of the dome will be about 12 tons, and the devices for making it revolve easily are very ingenious; the endeavor is to substitute rolling for sliding friction. For this purpose a live-ring is employed. This consists of a number of wheels set at equal distances around a circular track; on the circumference of these the dome rolls. The telescope, which is now being completed, will be a very valuable and expensive instrument. The diameter of the object-glass will be 20 inches and the length of the tube about 26 feet, of the best hard-rolled steel.

The formidable naval graving or dry dock, in course of construction at Esquimalt, on the Pacific Coast, under the direction of the British Government, is described by a correspondent lately visiting in British Columbia. This huge dock, now almost finished, is 450 feet long on the coping level and 430 feet long on the floor. It is 90 feet wide on top and 41 feet wide at the bottom. It is excellently constructed of hard sandstone, quarried near by, with a trauling caisson of wrought iron. Fortunately for any enemies of Great Britain on the Pacific Coast of North and South America, the dock has been finished on the basis of naval requirements of 20 years ago, and is not now large enough for the first-class vessels in the English navy. Still more fortunately for this country, it is not so large or so good a dock as the one under way in California. The contract for this Canadian dock was awarded in November, 1864, and work was begun early in the following year. It cost about \$900,000, which is defrayed by the joint contributions of Great Britain and the Dominion.

One of the New York morning dailies has taken pains to collect the statistics of defalcations in the United States for a series of years, and beginning with 1878 finds that there were 34 instances of official dishonesty during that year, and that the amount of money involved was \$2,784,806. Few of the offenders "met any punishment, being able in many instances to condone their offense by negotiation and the surrender of a part of their plunder." Our contemporary proposes to show the rapid growth and alarming extent of heavy defalcations by trusted individuals during the past ten years.

A correspondent at Port au Prince shows how narrowly Hayti escaped another revolution last May. Happily after a few days of martial law the leading officials in rebellion were exiled and quietness was restored. The writer says: "The principle that 'to the victors belong the spoils' reigns supreme, and is the sole issue in Haytian politics. The effect has been most disastrous. No material and consequently no moral and intellectual ad-

vance has been possible, and there is reason to believe that there has been actual retrogression until quite recent times. The magnificent sugar and coffee plantations of the French, with their systems of irrigation, have been allowed to go to ruin, and are now indistinguishable from the surrounding forests. The island is almost in a state of nature, except in the immediate neighborhood of the seaports. The exports are the spontaneous production of an amazingly fertile soil, principally dye and cabinet woods and the coffee pickings of the old plantations. All exports and imports are taxed to the extreme limit—just short of prohibition. Still, not a single article is manufactured by the Haytians. Haytian laws forbid a white man holding a title to land; nevertheless, the bulk of the mercantile business is carried on by German, French and American companies. The wealthy Haytians derive their revenues from ground rents in the cities and the spoils of office, consequently they have comparatively little to lose by revolution, which is their occupation and amusement. By the black savages of the interior a revolution is always welcomed with fierce joy. It is their opportunity to loot and burn the stores of the hated whites."

Real estate movements in New York city this spring are sluggish. Neither dealers nor builders take hold with avidity. Nevertheless, applications for new buildings are numerous in Brooklyn and New York. It is noticed that while there is much less activity in the building industries compared with one year ago, the scale of expenditure averages higher.

The Melbourne Exposition, to open August 1, will commemorate the founding of European settlements at the antipodes. The building is a grand structure 1240 feet long and 1000 feet wide, comprising, with its temporary annexes, more than 1,000,000 square feet. The area according to divisions is as follows: Space available for outside exhibits, 8½ acres; area of main buildings, machinery and temporary annexes, 23½ acres; total area of gardens, 12 acres; Carlton gardens, 19½ acres. Total, 63 acres.

The nucleus of the great Southern empire now has a population of close on 3,750,000. The latest statistics on the subject give the following:

New South Wales.....	1,044,000
Victoria.....	1,035,943
Queensland.....	359,059
South Australia.....	315,000
Tasmania.....	140,711
Western Australia.....	44,532
Total.....	2,939,245
New Zealand.....	645,615

Grand total.....3,584,860
The principal centers of population are Melbourne and its suburbs, estimated at 400,000, Sydney, 370,000, Adelaide, 135,000, Brisbane, 55,000, Hobart, 30,000, Perth, 6000 and Wellington, New Zealand, 28,000. In addition there is Auckland and New Zealand with a population of say 50,000, and Dunedin with a somewhat smaller population.

The public benefactions of the Vanderbilt family are held up as an example to the rich people in other cities. The Club-House for railroad men, the Hospital and Nurses' Training School for women and the Mission Church, all the gift of Cornelius Vanderbilt; the Hospital for Cancer Patients, erected and endowed by Wm. K. Vanderbilt and his married sisters, and the Free Circulating Library in Greenwich avenue, built and to be supplied with books at a cost of \$100,000 by George Vanderbilt, are instanced as proving that the present heads of the family are "really determined to be something more than mere millionaires."

MANUFACTURING.

Iron and Steel.

W. H. Peters, C. E. Murdock, George Peters, Jas. F. Peters and John Peters, Sr., are the incorporators of the Jackson Furnace Company, formed to operate the Huron Furnace property, at Jackson, Ohio, which they have purchased. The capital stock is \$25,000. The purchase includes 235 acres of coal land, and there is a shaft mine at the furnace from which coal will be obtained without the labor of transporting it. Ore and limestone from the Lawrence Furnace lands will be used. Huron is a 25-ton hot-blast furnace, size 50 x 13 feet, which was remodeled seven or eight years ago and has been idle for some time past. The new company propose to have the furnace in blast by the 1st of August. John Peters, Sr., was made president of the company, J. F. Peters, vice-president and W. H. Peters, secretary and treasurer. The last-named gentleman will have charge of the property.

Mr. H. W. Rathbone, president of the Elmira Iron and Steel Rolling Mill Company, Elmira, N. Y., informs us, under date of June 30, that the report of a stoppage at the works, printed in our last issue, is incorrect. The mills and furnace are in full operation.

The Struthers Furnace Company of Struthers, Ohio, have secured another lease of the Struthers furnace at that place from Mr. Fayette Brown, receiver, and will probably put it in operation as soon as repairs now being made are completed, which will be some time about August 1 next.

In answer to a report that the Pine Iron Works of Joseph L. Bailey & Son, located at Pine Iron Works P. O., Pa., would close down for an indefinite period, we received the following from the firm under date of the 25th ult. "We are running about half time, but have no intention of closing down at present. Trade here is very dull, the 'tariff agitation' in Congress rendering it uncertain and consequently dull."

Mount Laurel Furnace, owned and operated by the Clymer Iron Company, of Temple, Berker County, Pa., will be blown out about the 5th inst. for repairs, which will be made during the latter part of the year. The furnace will hardly resume operations again this year.

Isabella Furnace, of Jos. D. Potts, located at Barneston P. O., Chester County, Pa., was blown out on May 27 last for repairs, which are now being pushed to completion as rapidly as possible.

The Virginia Nail and Iron Works Company, of Lynchburg, Va., under date of the 28th ult., write us as follows: "We blew in our new furnace (the Nannie B) on the 12th inst. She has been running along very nicely, making an excellent quality of pig iron from James River ores. We, of course, use coke. Dimensions are 65 feet high, 12 foot 3 inch bosh, 6 foot 6 inch hearth, with 7 foot 6 inch top; commenced work in May, 1887, on foundations, &c. We use water-power. The furnace is fitted up with two iron-pipe stoves. The gas not required for the stoves is taken to the heating and puddling furnaces of our rolling mill."

In our issue of last week we made mention of the fact that the blast furnace of the Penn Iron and Coal Company, at Canal Dover, Ala., had blown out for repairs. We have since received the following advices from the company, under date of the 27th ult.: "We blew out after a continuous campaign of 28

months. Will put in new lining and bosh complete and make considerable addition to blowing capacity. We are located in the middle of the Blackband ore district of the Tuscarawas Valley, and make a specialty of blackband foundry iron, using a larger percentage of blackband ore in our Tuscarawas pig iron than is used in any blackband brand made in the United States. We will blow in again about August 15 next.

The entire plant of the Sharon Iron Company, at Sharon, Pa., closed down on Saturday, the 30th ult., for repairs and stock taking, and will probably not resume until a settlement of the wage scale trouble takes place.

In our issue of last week we made mention of the failure of the Cartwright Iron Works, of Alikaima, Ohio. A press dispatch from Steubenville, Ohio, gives the following additional particulars of the failure: The statement of liabilities of the Cartwright Iron Works, which assigned on Wednesday evening, confirms the original estimate. They will reach \$60,000. The assignee refuses to make public the names of the creditors and the amounts due them, but representatives of several Pittsburgh iron and machine firms were in the city to-day investigating affairs. It is said that the company held a large block of Graff, Bennett & Co.'s paper, upon which they could not realize. This, with the inadequate size of the plant, precipitated the failure. The company have only about \$7000 personal property above the value of the plant, upon which there is a mortgage of \$9000 held by the Miners' and Mechanics' Bank, of this city. This bank sold the company the plant for \$12,000 originally. The assignee has issued time certificates to the employees for their wages, which they have negotiated for 50 cents on the dollar. It is now feared that the personal property will not be sold for much more than to pay the employees, to whom there is owed \$3500, and the costs of assignment.

On Thursday, the 28th ult., the employees of the Linden Steel Company, Limited, of Pittsburgh, were notified that their wages would be reduced 10 per cent., to take effect on July 1. The reduction applies to all men who are not members of the Amalgamated Association. It is expected that the men will refuse to accept the proposed reduction. A meeting of the employees will be held during the present week to take action on the matter.

The entire plant of Singer, Nimick & Co., Limited, steel manufacturers, at Pittsburgh, has been closed down for an indefinite period. Some time ago the firm posted a notice of a reduction of 10 per cent. in wages, to take effect on June 1 last. This was accepted by the workmen and the works continued in operation until the next meeting of the Amalgamated Association and the Knights of Labor, which were held at Pittsburgh. The firm employs men who belong to both of the organizations, and, having a reduction of wages without the authority of the associations to which they belonged, they were threatened with expulsion if the reduction was not at once restored. The firm refused to grant this and on Wednesday, the 27th ult., the following notices were posted on various parts of the works:

Notice.—Wednesday, June 27, will be pay day instead of Saturday, June 30.

SINGER, NIMICK & Co., }
PITTSBURGH, June 27, 1888. }

This is to give notice of the discharge of all our hands. Any person desiring to enter our employ hereafter may make application to Mr. F. B. Nimick, either personally or by mail.

W. H. SINGER, Chairman.

It is evidently the intention of the firm to deal with its employees individually hereafter, so as to prevent another interference from what are considered outside

parties. It is expected that a majority of the employees will withdraw from labor organizations to which they belong and that the works will resume operations in a short time.

Mr. Albert Broden, of Reading, Pa., has been appointed superintendent of the furnaces of the Philadelphia and Reading Coal and Iron Company. He will have charge of some ten furnaces along the main line of the Reading Railroad and branches.

A large brick addition is being made to the galvanizing department of the National Tube Works Company, of McKeesport, Pa. The entire plant of this company was closed down on Saturday, the 30th ult., for the purpose of making repairs. As soon as these are completed part of the works, at least, will resume operations. The report published that the shut-down was for an indefinite period is untrue.

At a meeting of the directors of the Bethlehem Iron Company, held at Bethlehem, Pa., on Tuesday, the 26th ult., a local paper states that the report of the president showed a very material falling off in the output and profit. The profits during the past year were hardly sufficient to pay the interest on the funded debt and the dividends to stockholders. The following were elected directors: E. P. Wilbur, Robert H. Sayre, Sr., Robert P. Linderman, W. W. Thurston, Joseph Wharton, John Knecht and George H. Myers. W. W. Thurston was then elected president, R. P. Linderman, vice-president; Robert H. Sayre, Sr., general manager; John Fritz, general superintendent; C. O. Brunner, treasurer, and A. S. Schopp, secretary.

The Robinson-Rea Manufacturing Company, of Pittsburgh, manufacturers of rolls and rolling-mill machinery, report that they are crowded with orders for rolls and are running their works to their utmost capacity in order to keep up with the demand.

Robesonia Furnace, at Robesonia, Pa., has again gone into blast.

A new engine has recently been placed in the works of the New Castle Wire Nail Company, at New Castle, Pa., to which is attached a belt 30 inches wide and $\frac{1}{4}$ inch thick. The above company have increased their capacity by an addition of ten new Nail machines, making a total of 75 nail machines now being operated by the firm.

Three new blast furnaces are to be erected near Birmingham, Ala., at a cost of \$700,000. The projectors of the enterprise are H. F. De Bardeleben, of Birmingham, and men from Charleston and Savannah. Work is to be begun immediately.

Machinery.

The Joliet Steel Company, of Joliet, Ill., have ordered an electric plant, using the Waterhouse arc and incandescent system made by the Waterhouse Electric and Mfg. Company, of Hartford, Conn. The Oregon Improvement Company have also purchased a combined arc and incandescent plant of the Waterhouse system, for the purpose of lighting their wharves, machine shops and railroad depot at Seattle, Washington Territory.

The machinery for the new steel Hoboken ferry-boat Bergen will consist of a triple expansion engine with cylinders measuring 18 $\frac{1}{2}$, 27 and 42 inches in diameter, with 24-inch stroke. C. H. Delamater & Co. are building the engines.

The Secretary of the Navy has awarded contracts for turning and boring lathes for the Washington Navy Yard as follows: For three lathes for 16-inch B. L. R. hoops, to Binns & Housechild, of Harrison, N. J., at \$45,000; for one lathe for

6-inch B. L. R., to Bement, Miles & Co., of Philadelphia, at \$19,950; for five lathes for 6-inch B. L. R. hoops, to Detrick & Harvey, of Baltimore, at \$15,342; and for five lathes for same to I. H. Johnson, Jr., & Co., of Philadelphia, at \$23,298.

The Deane Steam Pump Company, of Holyoke, Mass., have issued a small catalogue dated April, 1888, showing a number of engravings of their different pumps and giving brief particulars.

The Pennock Bros., car builders, Minerva, Ohio, have lately added a 100,000-Howe track scale, made by the Howe Scale Company, Rutland, Vt., to their works. At the natural gas center, Findlay, Ohio, the Howe scale is largely represented, and late contracts have just been completed with the Findlay Iron and Steel Company for 100,000-pound track scale, muck-bar scale and other smaller scales; also with the Briggs Edge Tool Works, David Round Chain Works, the Wetherald Wire Nail Company and David Kirk. Large Hopper scales were last week put in at Pompei, Mich.

A very interesting catalogue has just been sent us by the Thomson Electric Welding Company, of Lynn, Mass., referring at some length to their process of electrically welding different kinds of metal, and containing engravings of the machinery employed. The assured practical value of the process makes a perusal of their pamphlet desirable.

The Philadelphia and Reading Railroad Company have received from the Baldwin Locomotive Works six of the largest locomotives in the country. They are intended for the Frackville branch, and will weigh 75 tons or 168,900 pounds each. They will have the wagon-top boilers.

The Westinghouse Machine Company, of Pittsburgh, are building six large engines for shipment to Rome, Italy.

The partnership heretofore existing between S. H. Campbell and W. J. Boston, in the Cloud Foundry Company, of Allegheny City, Pa., was dissolved on the 26th ult. by the retirement of W. J. Boston. The business will be continued by the remaining partner.

At the annual election of the Heine Safety Boiler Company, of St. Louis, held on Saturday, the 16th ult., the following gentlemen were elected to constitute the board of directors for the ensuing year: E. D. Meier, Robert W. Hunt, Fred Suessdorf, Theo. G. Meier, Chas. F. Foster.

Messrs. Howard & Morse, 45 Fulton street, New York, have issued a circular, dated June 5, in which they direct attention to the fact that they have commenced suits against manufacturers and users of ventilating wheels infringing their patent for the Blackman air propeller.

Hardware.

The Rockford Bit Company, Rockford, Ill., are about to remove to Kokomo, Ind.

Cincinnati Wire Company, Cincinnati, Ohio, are at present shut down for repairs, but expect to resume the running of their mill in about a week.

E. C. Atkins & Co., Indianapolis, Ind., since the introduction of natural gas, which is being conveyed from a distance of 30 miles north of the city, have been using the fuel in all departments of their saw manufactory with excellent success, particularly in the tempering department, the furnaces in which have been entirely remodeled after designs patented by them. The change enables the company to produce a much more uniform temper and even flat surfaces for their blades.

Miscellaneous.

Among recently authorized corporations in Illinois are the following: The Empire Mfg. Company, of Rock Falls, to operate in agricultural implements and barb wire; capital, \$50,000; incorporators, John J. A. Zeller, L. E. Phelps, R. K. Swift and C. W. Parker. The Hydro-Pneumatic Mfg. Co., of Chicago, capital, \$100,000; to manufacture pneumatic and hydraulic apparatus; incorporators, J. W. Powers, F. Benoit, F. M. Weller, J. S. Hunt and J. B. Edwards. The Benjamin Machine Company, of Chicago, capital, \$50,000; for the manufacture of woodworking and other kinds of machinery; incorporators, R. B. Sample, H. M. Graham and R. W. Morrison. The Chicago and Calumet Rolling Mill Company; to manufacture, buy and sell iron and steel and the products thereof; capital, \$500,000; incorporators, John L. Pfau, Warren F. Pitney and Edward C. Starr.

A heavy vein of natural gas is reported to have been struck on the 27th ult. on the farm of Henry Marshall, in St. Louis County, 12 miles west of St. Louis. The gas was encountered at a depth of 1200 feet, and a flame 35 feet high is burning at the mouth of the bore. A company has been organized to pipe gas to St. Louis from Sparta, Ill.

About 250 brass workers, who for seven weeks were on a strike in two of the principal brass works of Cincinnati, declared the strike off on the 28th ult. The shops concerned in the strike are now free shops.

The Heine Safety Boiler Company have an order for two 85 horse-power boilers for the water works at Jefferson City, Mo.

The Worthington Hydraulic Works have sent two large pumps to the Missouri Pacific Railroad Company's coal mines at Rich Hill, Mo.

On Saturday, the 30th ult., the Northwestern Mining Company, of Brockwayville, Pa., gave notice of a 10 per cent. reduction in the wages of all miners and laborers, to take effect July 1. The company employ 1500 men.

Electric Motors for Naval Use.

Lieut. B. A. Fiske, writing in the *U. S. Army and Navy Journal* on "Motors for Naval and Military Use," says:

Three years ago the ability of electric motors to train guns was shown to the authorities in England, and since that time much progress has been made in perfecting the apparatus for applying electric motors to this kind of work. Little difficulty has been experienced, for though there is nothing that requires such accurate and rapid handling as a great gun in a seaway, there is no other engine capable of such accurate and rapid work as an electric motor, and its advantages over steam, hydraulic and pneumatic engines are so marked that it would be idle to compare them. The indications now are that we shall have at least one gun in the Chicago trained by electricity.

But it is not in the training of the guns alone that motors can be advantageously employed; they can also be used in elevating. In the Atlanta, when rolling from 10° to 20° each side, and from 10 to 12 times per minute, the line of sight of the guns sweeps past the horizon so fast, even near the end of a roll, as to require from the gun captain a rare degree of skill if we would have him shoot as accurately as such fine guns should be shot. The trouble is that the gun is beyond his control except in the matter of training, because the most that he can do is to wait for a favorable time of roll and catch the line of sight on the target as best he can. To use the gun effectively he needs some arrange-

ment by which he can put the gun on the target and keep it there, independently of the rolling of the ship. He needs some arrangement like the shoulder piece of the Hotchkiss guns, by means of which experiments on this ship have shown a very little practice enables a man to keep the line of sight almost exactly on the horizon or on any other object.

Electricity puts this power directly into the hand of the gun captain, for by means of a small electric motor on the elevating gear and a suitable switch he can raise, or lower, or stop the gun by simply moving his hand. The gun captain being able to train the gun to the right or the left, and to raise it up or down, the only thing left to do is to give him an electric primer, fired by means of an ordinary "push button," so that he can fire the gun quickly when the sights come on, instead of losing time by hauling on a lock lanyard. The advantage of this quick means of firing by using the electric primer stands out clear when we recollect that in a ship, say the Atlanta, which rolls in a seaway about 3° per second on the average, an error on the part of the gun captain of only $\frac{1}{10}$ of a second of time means a vertical error, on a target a sea mile distant, of about 31 feet. This remark applies, of course, only to the individual firing, and not to broadside firing by electricity, the advantages of which are not so palpable.

A very neat use for electric motors would be for hoisting ammunition. On board the Atlanta we use five men at each shell hatch, and their work could be done more quickly and quietly by a 2 horse-power motor costing, say, \$200. This would require one man to operate it, and would leave four men from each hatch for work at the guns. Coal could be similarly hoisted on board. Since all our new ships are fitted with dynamos for feeding electric lights, why not have them feed electric motors also, every horse-power developed by the motors being about the same thing as adding, say, nine 16 c. p. lights. Of course, the dynamos must be safe below the water line, and they must all be similar, and feed into the same main wires, which go all through the ship like gas pipes through a city, the incandescent lights, search lights and motors receiving their supply from these main wires, and one, two, or three dynamos being run at a time, according to the number of lights and motors in use. Nothing could be more simple and effective than such an arrangement, and nothing could contribute more to the efficiency, health and comfort of a ship.

The Merchant Steel Association.

A joint meeting of the Merchants' Association of the United States, which is composed of the crucible and open-hearth steel manufacturers, and the Bessemer Merchants' Steel Association, composed of the Bessemer steel manufacturers, was held in the Monongahela House, Pittsburgh, on Wednesday, the 27th ult. The meeting was fairly well attended, about two-thirds of the members of each organization being represented. After a full discussion on the present condition of trade was had it was resolved to make no change in the list of extras recently adopted by the associations. Business was reported to be rather dull, with no immediate prospect of an improvement. Nothing but routine business was transacted. The report published in some of the Pittsburgh papers to the effect that the meeting was held for the purpose of receiving the wage scales governing steel works to be presented by the Amalgamated Association is untrue, as neither organization deals with the labor question as a body, each member acting individually. The associations adjourned to meet in New York City some time during the present month.

The Iron Age

New York, Thursday, July 5, 1888.

DAVID WILLIAMS, - - - PUBLISHER AND PROPRIETOR.
CHAS. KIRCHHOFF, JR., - - EDITOR.
GEO. W. COPE, - - - ASSOCIATE EDITOR, CHICAGO.
RICHARD R. WILLIAMS, - - - HARDWARE EDITOR.
JOHN S. KING, - - - BUSINESS MANAGER.

Guns for the Army.

During the past few days an animated discussion has been going on in the Senate over an amendment to the Army Appropriation bill, emanating from the Committee on Military Affairs. The principal items of this amendment called for \$750,000 for the erection and purchase of buildings, machinery and tools for an army-gun factory at the Watervliet Arsenal, West Troy. It provides for an appropriation of \$5,000,000 for buying rough-finished steel forgings for 8, 10 and 12 inch guns, in quality and dimensions conforming to specifications, subject to inspection at each stage of the manufacture and including all the parts of each caliber. The successful bidder agrees to build a suitable plant and begin to deliver the steel for the smaller calibers at the expiration of not more than 18 months and that for the largest calibers at the expiration of not more than three years from the date of the acceptance of the contracts. It appropriates \$500,000 for submarine mines, for continuing torpedo service and for instruction in the torpedo service and \$100,000 for controllable torpedoes adapted to coast defense.

Considerable objection was at first raised to the amendment on the ground that it was not germane to the bill, but its relevancy was decided in the affirmative. The true character of the opposition was then developed in a speech by Senator Gorman, with whom Senators Plumb and Cockrell joined forces. In the absence of the full report of the remarks of the first named, which are not yet printed in the *Congressional Record*, the position can only be inferred by the replies it brought out. It appears to have been that it is wiser to await developments of inventive genius and private enterprise rather than to plan the work of providing for armaments and coast defense with the hands of army officials who do all they can to throttle progress which does not follow prescribed lines. The Missouri Senator opposed the appropriations chiefly on the ground that it is foolish to suppose that any foreign power will dare attack us, while the Kansas Senator read extracts from some mysterious authority who claims that the pneumatic dynamite gun has ceased to be experimental. This person asserts that the gun in question has a range of about 2 miles, "with the prospect that that range may be increased to 5 miles," and adds, "if ordnance officers were not a little impervious to the force of evidence, we should have had the solution of the harbor defense question settled by the general adoption of the gun."

The proposition to at last provide the United States Army with at least a few modern guns found its most powerful and best informed champion in Senator Hawley, who reviewed the history of the many

efforts made to reach a clear understanding of the most pressing requirements of the service and the best means of meeting them. The consensus of opinion of four or five boards and commissions in which legislators, army and navy officers and civilians have had a voice has favored the plan adopted for the navy and now proposed for the army—viz., purchase of the rough forgings from private establishments, and the assembling and finishing of parts at a government factory. While the navy has the right to advertise for the building of 148 modern steel guns, and has a good many of them under way, the army, with the exception of three or possibly four, has not a single piece of ordnance capable of resisting modern ships of war. The start which it is proposed to give this branch of the service would enable it to acquire in a number of years, 50 12-inch guns weighing 50 tons each, 120 10-inch guns of 30 tons, and 100 8-inch guns of 15 tons.

However opinions may differ on the different systems before the country, either in the embryo state of invention or in the more advanced stage of at least partial backing by experiment or trial, we should recognize the crying necessity of having a few weapons of modern power about which there can be no doubt. We have complacently looked on while other nations down to the minor States of South America and semi-barbarous Asian countries have equipped themselves to wage modern warfare, congratulating ourselves that they were paying for experience which would cost us nothing. We have proudly pointed to the brilliant record of American inventive genius coping with extraordinary problems in times of great emergency. Let it be granted that when the pinch does come some one, until then pitied and tolerated as a crank, will extricate us out of trouble by bringing out some new infernal machine. While it is being built and tested we have been at the mercy of any pugnacious third-class power. No one is less liable to get into complications with foreign countries, but nevertheless it may prove a very good investment to provide a modest equipment for the army, now that the small beginning with the navy is well under way.

Silver Coinage in Europe.

Some time since we referred to the decline in silver, and return to the subject because now, at the close of the first half year, the cause of the present depreciation begins to be better understood. There have been increased silver shipments to British India, the Straits Settlements and China; production has increased steadily and the demand for coinage purposes in Europe has diminished so far this year. Silver therefore has been unable to recoup the decline of 2½d since January 1, and present prospects for a rebound are anything but encouraging.

Last year was still a tolerably active coinage year in Europe; this year the demand for that purpose is so slack that neither the Bank of France, on behalf of the French Government, nor the Banque de l'Indo-Chine, Paris, have so far availed themselves of the decline to coin some silver dollars for Tonquin, probably because they expect a further decline in

the present condition of the Silver market, and the two institutions named are presumed to watch the silver market more closely than anybody else over there. The silver shipments to the East from January 1 to the middle of June were as follows:

	1888.	1887.
From London to India..	£2,483,333	£1,527,550
From London to China..	224,229	128,486
From London to the Straits.....	228,508	190,920
From Venice and Marseilles.....	233,197	942,009
Total.....	£3,169,267	£2,788,965
Increase.....		380,302

A glance at the operations of the European mints last year for purposes of coinage in the way of actual purchases of silver will enable us to form an idea of what is called in Europe a tolerably active year in this matter:

Silver Purchases by the Mints in 1887.

In	For	Francs.
France, Cochinchina.....		12,000,000
" Hayti.....		2,000,000
England, local fractional circulation		12,000,000
" the Colonies.....		5,000,000
Switzerland, local fractional circulation.....		1,000,000
Scandinavia, circulation.....		700,000
Portugal, ".....		5,000,000
Russia, ".....		3,000,000
Austria-Hungary, Maria Theresa thalers.....		6,000,000
Total.....		46,700,000

A reference to the different countries will give us a still better insight.

In France the colonial trade dollar is at the present price of silver only worth 3.77 francs, while the Mexican dollar is bringing 3.80. At no previous time did silver coin range so low in France. In England an extra effort was made last year in the way of coining silver for local purposes, including the famous jubilee 4-shilling pieces, £851,000 thus having been struck off. Now the United Kingdom has silver coin enough for several years to come, and this may also be said of the colonies whither fractional coin has of late years been shipped in large amounts. To Hong Kong, \$1,210,000 went last year, direct from the mint, and to the Straits \$79,000. Germany merely recoined 3,000,000 marks, and in Belgium the recoinage of 7,800,000 francs, commenced in 1886, was completed, and the profit of 500,000 francs made on that amount by the Government is set aside to figure as part of an offset against the eventual loss to be sustained on the amount Belgium will have to take off the hands of France when the Latin Union liquidates. Belgium will then receive about 250,000,000 francs, on which the loss to-day reaches the respectable figure of 75,000,000 francs. A more ruinous international concern than the Latin Union there certainly never was, if one of its smallest members is condemned to make such sacrifices.

Italy completed in 1887 the recoinage of 32,400,000 lire or francs of fractional coin. That country has still on hand 200,000 kg. of fine silver in the shape of old Neapolitan piastres, but has agreed not to recoin them into five-franc pieces. These piastres are a deposit in the vaults of the many issue banks as a reserve for bank-note circulation. On Feb. 29, 23,000,000 lire or francs were tied up in this shape. So far Italy has not been able to make up its mind to part with this accumulation of old piastres. Bankers have renewed their offers to the Government quite recently, but they were declined, the loss appearing too heavy. Switzerland, belonging to the

Latin Union, coined 1,400,000 francs last year, and had to buy 1,000,000 at Frankfort, but has now an ample circulation of fractional silver.

In Scandinavia only 500,000 crowns of 28c. American were struck off. Holland recoined to a moderate extent, only buying 180,000 guilders' worth of new silver, and Spain recoined 59,012,000 pesetas or francs' worth of old pillar dollars. Portugal coined 889,000 milreis, and Russia 1,500,000 rubles of a low standard. Austria-Hungary uses for its own circulation only domestic silver from its own mines, and continually shifts from bars to coin and *vice versa*, hence it exercises no influence through its mint operations on the silver market. The amount coined was 6,930,000 florins for Austria and 2,022,000 for Hungary. But, on orders received from Italy, Austria coined last year 3,175,000 florins' worth of Maria Theresa thalers for the use of the Italian expedition to Abyssinia, where this kind of coin has currency. A little silver was bought at Berlin to complete there the coinage of £435,000 Egyptian.

It will be seen that most of the European nations completed last year what there was still to be accomplished in the way of coinage and recoinage, which fact, we repeat, goes to explain the lack of demand for silver in that part of the world so far this year. In the absence of this element—usually an important natural prop—the near future of silver values appears all the more problematical.

The Salesman With Discretionary Power.

There are salesmen *and* salesmen. Many of them are fitted by nature and by experience to manage large interests, and their tact, judgment and knowledge of human nature enable them to succeed where others ignominiously fail. They can be given large discretion by their employers, who are confident that only in cases of absolute necessity will the lever of a lower price or an additional discount be pulled to secure an order. Other considerations will be brought into play by them, a sale at a good price being considered more of an achievement than a heavy order actually bought by a special inducement in cut rates.

It is an adage among salesmen that "any fool can sell at cut rates." If an inexperienced man, or one with limited resources has the power to name lower prices when necessary, he is very likely to think that every time he meets a buyer the emergency confronts him. If the buyer is indifferent, or is well supplied with goods, or prefers to wait for a week or two before deciding what to do, straightway the lever of a cut price is pulled and the power of that weighty influence is brought to bear. If the cut is deep enough, or if this is what the buyer has been playing for, a sale is effected and the salesman is happy, probably a great deal happier than his principal when the report of it is laid before him. In times of ordinary activity such a salesman will naturally do a large trade. Goods are moving, their places must be filled, and he is the very man all the buyers are looking for.

When trade is dull, however, and prices are dragging on the very bottom of abso-

lute cost, the salesman with discretionary instructions is a serious demoralizing element. He does not possess the power to build up trade for his own house, but is able to make matters very uncomfortable for his competitors. The nail trade can be taken as an illustration of this. Prices are exceedingly low—so low that many factories prefer not to run rather than meet the commercial conditions now prevailing. The demand for nails is quite limited, and the most vigorous drumming cannot induce purchases of more than a few carloads. Those who need stock will buy, and those who have a supply will not buy. At such a time it is useless to offer inducements of lower prices, as the sluggish current cannot be moved without some still stronger influence. Yet there are salesmen who persist in forcing nails upon buyers with ample stocks, and who are so short-sighted that they do not see the effects of that course communicated all along the line. Such salesmen should have their instructions remodeled, and it would probably not hurt very much if they were to be rebuilt of something in the nature of cast iron. This is a feature of the situation worth looking into by those who are anxious to improve the condition of trade, whether in nails or in other staple goods sold through salesmen.

A New Bar Iron Association.

Representatives of rolling mills in Ohio, Indiana, Michigan and Illinois, met at Cleveland, on the 27th ult., to form an association for the bar iron trade. The name adopted is "Association of Bar Iron Manufacturers." It is intended to regulate matters pertaining to the conduct of the iron business in order to secure more harmonious action among the manufacturers of the States named. No attempt is to be made to dictate prices or to order a stoppage of the mills. Nor will the question of wages be interfered with, and the signing of the scale is to have no place in its deliberations. It cannot be called a trust, as reported in dispatches from Cleveland to the Western papers, but it is simply an association of manufacturers like a great many other associations existing all over the country. Being a business association, its proceedings are private. Meetings are to be held subject to the call of the secretary or Executive Committee from time to time to discuss the situation of trade and to take such action as may be deemed desirable. While the report is incorrect that "each manufacturer agreed to regulate his output and to shut down when ordered and to leave prices to the association," yet an attempt will be made to keep prices steady by the more thorough interchange of information with one another and the investigation of reported low sales and cut prices before they are allowed to influence other transactions. The necessity for doing something to correct the condition of affairs in the bar iron trade is shown by the fact that bar iron has been sold on a parity with old rails at \$16, although they have not been bought laid down at the mill within \$2.50 to \$4 of this price. Further, it may be stated that, in previous periods of depression, when bar iron was sold so low, the card of extras was not cut completely in two as now, but full extras were obtained on many sizes. The follow-

ing permanent officers were elected: Myron C. Wick, Youngstown, president; S. A. Fuller, Cleveland, vice-president; C. W. Scofield, Cleveland, treasurer; George H. Taylor, Cleveland, secretary. The executive committee consist of Major Collins, Brazil, Ind.; James Neilson, Youngstown; H. O. Bonnell, Youngstown; J. S. Van Alstyn, Detroit; M. Churchill, Zanesville, Ohio; R. H. Lewis, Chicago. The details of the organization have not been entirely completed, but the promoters hope to secure the co-operation of at least four-fifths of the manufacturers of bar iron in the region covered.

Windmills for Electric Lighting.

With the extensive and constantly growing application of wind-power, specially noticeable in the West, where the windmill for pumping has become a familiar landmark, it is all the more noteworthy that this motor has not been pressed into service to any appreciable extent for isolated electric lighting on the storage battery plan. It cannot be because of lack of efficiency on its part, as the contrary is being demonstrated daily, and the low percentages of accumulated energy hitherto yielded by storage batteries may therefore, with some reason, be held accountable for the neglect which has been shown in the matter. Even this cause, however, if such it be, has of late lost in importance, the development and improvements in the manufacture of storage batteries having been such as to impart to them a reasonably high degree of efficiency. While the correctness of the remarkably economical figures claimed for some of the types now in the market may well be questioned, an average return of at least 60 per cent. of the electrical energy put into an accumulator may be expected, and with this a combined windmill and storage battery plant should, in certain locations, offer superior inducements as a means of supplying electric light. The power, strictly speaking, costs nothing beyond first cost of the motor and interest, the expenses of maintenance and wear and tear, and the sum involved in procuring the dynamo and batteries, whether in the shape of a price with interest, &c., paid for their purchase, outright or in the form of a fixed rental, paid to a controlling company. The necessarily fluctuating character of the power would scarcely be very objectionable since the energy would be stored whenever available, at intervals perhaps, in comparatively small amounts, a large enough storage capacity being provided, and drawn off when desired. The working expenses would be small and the power supply sufficiently reliable for the purpose to be accomplished. In only a few cases, however, that we know of has advantage been taken of the system, and then mainly for experimental purposes.

A record of the results obtained in one instance was given a few weeks ago in a paper presented to the Glasgow Philosophical Society, and, though rather incomplete, was none the less valuable because of its direct practical significance. Professor Blyth, the author, had fitted up a small windmill plant for lighting a cottage, the windmill being after old English type, erected in the garden. The tower consisted of a wooden tripod, suitably braced, and supported the wind shaft 33

feet above the ground; four sail arms were used, each about 18 feet long. The dynamo, also an old form, was driven directly through a rope and charged 12 cells. With this arrangement ten eight-candle power lamps were easily supplied, and, with a good breeze blowing, as we find it stated, there was sufficient storage in half a day to supply the lights for four evenings of about four hours each. A cut out arrangement disconnected the cells from the charging circuit when the dynamo ran below a certain speed, so that the action was entirely automatic and the windmill could be allowed to run day and night without danger of the cells discharging themselves through the dynamo. The possibilities of this plant, with all its imperfections, afford some measure of what might be accomplished with improved appliances and should encourage further work in the same line. With windmills of the latest type, storage batteries and dynamos of modern construction and a general improvement in all the working conditions, as now attained, additional experiments would be well worth trying.

Building Up New Towns.

We have frequent occasion to admire the enterprise which characterizes the inhabitants of the "new towns" of the country. They realize the necessity of calling the attention of adventurous spirits elsewhere to the opportunities still existing for the rapid accumulation of wealth. They appeal most strongly to the residents of the older East, whose surroundings have become more or less rigid by an apparent development of wealth-producing influences to a point of slow growth. Many turn anxiously toward some newer section of the country with the American hope in their breasts of "bettering their condition." The channel most convenient to reach these people sighing for a change of condition is the newspaper. Much is being accomplished by the press of the new towns in this direction. The "special editions" coming under our notice from time to time are almost invariably highly creditable to the towns whence they emanate. Whether they originate in the South or the West they breathe the true spirit of progress, and although too apt to exaggerate advantages and conceal defects they are a very important factor in securing a diffusion of population which is perhaps of as great consequence in this vast country as the direct pecuniary benefit of the individuals influenced.

This is not always a matter of real estate speculation, although it usually happens that holders of real estate profit most when a new town is started. We have in mind notable exceptions to this rule, in which the promoters of towns have discouraged all efforts at "booming," and have bent their energies in the direction of solid, substantial growth, leading to enduring prosperity. Towns depending for their existence upon the development of iron or coal interests have too frequently been the prey of the real estate boomer, who invariably points to Pittsburgh as an example of what coal and iron will do in building up a city, but forgets to say how many years it has taken and what other influences have played a very important

part. Alabama's Birmingham may be further cited as an instance of the wonderful growth, in a few years, of a rural hamlet to a vigorous city, solely because of the mineral resources of the vicinage, but it should not be forgotten or overlooked that there are few, very few, localities in this or any other country so richly endowed by nature with all the essentials for making iron.

Although but few towns in this country are destined to be great manufacturing centers of far-reaching influence in the production and manipulation of iron, there are countless numbers in existence and yet to spring up in which manufacturing will be prosecuted in a modest, unpretentious manner, with no special flourish of trumpets, but with sufficient vigor to vitalize the neighborhood and properly diversify occupations. These towns may not all produce the iron which they manipulate, but they may have special advantages of some kind for the manufacture of articles of more or less general use. Nor is iron the only consideration to be viewed in this connection, although it naturally occurs to us in the most prominent light, being connected with the iron trade, and besides that it underlies in its partial use such a vast congeries of other industries. The way is open in the South and West, which has long been traveled in the East, for the introduction of more and more occupations to the great advantage of the localities in which they are planted and to the ultimate benefit of the whole country.

Increased population and new industries must enter the new towns together. This is the mission of the enterprising advocates and local advantages and attractions to whom we are referred. They are striving to secure both influences, and the intelligent zeal with which the movement is conducted must result in an increased migration from our overloaded centers of population and our full-grown Eastern factory towns to these promising points of new life and more bustling enterprise.

During the past few years the whole German iron trade has resolved itself into a series of pools, rings and combinations who run, or attempt to run, the business at home and abroad. Occasionally, in the plenitude of their power, they develop a despotism which must be startling even to some of the staunchest adherents of the system. A striking example is furnished by a circular lately issued, signed by 20 pig-iron manufacturers of the Siegen district. It appears that a firm in Frankfort offered for sale 7000 tons of pig iron for delivery during the second half of 1888 at a price lower than that fixed by the combination. Their offers were disturbing the trade, and it is asserted that investigation showed that they were trying to sell what they did not own. Indignation ran high, and the 20 firms alluded to appended their signatures to an agreement by which they bound themselves not to sell any iron to the audacious firm for the balance of the year—in other words, the firm in question was boycotted solemnly.

The fact is recorded by the *National Car and Locomotive Builder* that a class of locomotives on the Wisconsin Central were noted for a jarring, uncomfortable rattle about them when running at high speed. A great many experiments were tried to

find out the cause of the annoyance, and it was generally supposed by experts to be in the running gear, but no change that was suggested made any difference. When Mr. John Player took charge of the road's machinery his attention was soon directed to the engines referred to and their jarring tendency was complainingly dilated upon. Mr. Player rode a few trips on one of the engines and watched her performance carefully. He concluded that the trouble was caused by the side rods being too heavy. The rod without the traps was 91½ inches long and weighed 198 pounds. He reduced the rod in size sufficiently to lower the weight to 153 pounds. This cured the jarring. The rods remained sufficiently strong for the work they have to do.

The Wheeler Patents.

A Company was formed last week in this city to manufacture and control the sale of products to be manufactured under the patents of Elbridge Wheeler, of Boston. Among the directors of the company are George A. Evans, representative in this city of the Bethlehem Iron Company; Hon. John H. Rice, of Worcester, Mass., and Elbridge Wheeler. The latter has been long identified with efforts to produce composite articles of iron and steel, and of different grades of steel. He has made some interesting products, among which bars of high carbon steel with a soft center are notable. The leading feature in connection with them as contrasted with compound bars, soft center plates, &c., being that there is no union between the two metals, that no weld is attempted. Among other articles a rail has been rolled a few weeks since at the Bethlehem Iron Works from such a composite ingot, the center being soft steel, while the surface is steel much harder and higher in carbon. It is claimed that such a product would combine the valuable properties of hard steel for wear, with the immunity from breaking which the mild steel center would give. A process which has in it the prospects of important developments is the sand core process, for producing annular and hollow shapes. Mr. Wheeler makes the core by filling a box of the proper shape with sand, around which the steel is cast, generally by bottom casting. He has found that ingots with a sand core can be rolled and hammered in the usual way, and samples submitted show that under the treatment the sand has been considerably pitted to a solid mass, the existence of which would aid the iron in resisting compression strains, like in pillars, &c. By allowing the sand to flow out, after casting and before rolling, annular blanks for tubes, hollow axles and shafting, &c., are readily obtained.

Composite Steamships.—In the notices which have appeared in English papers on naval architecture at the Glasgow Exhibition attention has been directed to the models of two composite screw steamers intended for the Newfoundland and Labrador mail service, and which, in their way, are decided novelties. Owing to the quantity of ice encountered in these waters during a great part of the year, the owners of the vessels determined to frame them with iron and sheathe the frames with stout hardwood planks, the latter material being, in their opinion, better suited to endure blows from the ice than ordinary thickness of iron or steel plating used in vessels of 700 tons. The bows of the ships are shod with stout iron plates, and the rudders are also of iron. Composite vessels, and particularly steamers, are rare; met with at the present day, and there, we are told, are the first vessels of the kind that have been built upon the Clyde for very many years.

CORRESPONDENCE.

The Number of Men Engaged in the Iron Trade.

BUFFALO, July 2, 1888.

To the Editor: Will you kindly inform us how many persons are employed in the iron trade in all its branches from miners of coal and ore and makers of coke to the finished product?

We may state that at the outstart we have no figures later than those of the Census of 1880, although they may be used as the basis of some estimate, as follows. The Census figures were:

	Product 1880. Net tons.	Men employed.
Pig iron.....	3,781,021	41,875
Iron rolling mills including nail.....	2,353,248	80,133
Bessemer and open-hearth steel works..	983,039	10,835
Crucible steel works..	75,275	5,196
Forges and Bloomaries.....	72,557	2,939
Total.....	7,265,140	140,978

For the year 1887 the following estimate may be made covering the same ground:

	Product, 1887. Net tons.	Estimate No. of hands same proportion.
Pig iron.....	7,187,206	80,125
Iron rolling mills.....	2,588,500	89,000
Bessemer and open-hearth steel works..	3,433,491	37,840
Crucible steel.....	84,421	5,820
Forges and Bloomaries.....	43,306	1,750
Total.....	13,336,924	214,536

From this probably at least 10 per cent. must be deducted to allow for the fact that a greater output is being made with less labor in all departments of the iron trade, and notably in blast-furnace work. This would leave it roughly 193,000 hands in the iron and steel works themselves.

The quantity of iron ore used in 1880 was as follows:

	Tons.
Blast furnaces.....	7,256,684
Rolling mills.....	363,959
Bess. and open-hearth.....	7,327
Crucible.....	2,128
Forges.....	79,610
Total.....	7,709,708

The number of hands employed in mining 7,064,829 tons of iron ore in the census year was 31,668. The output for 1887 is estimated at 11,800,000 tons, which would indicate a force of 50,600 hands.

In 1880 the consumption of anthracite coal by furnaces and rolling mills was 3,222,498 tons. In 1887 it must have been at least 4,000,000 tons. In 1880, 70,748 hands produced 23,621,371 tons of anthracite, which would indicate 10,000 men for the iron works' fuel in 1887. In 1880 the furnaces and rolling mills consumed 5,659,055 tons of bituminous coal. Taking into account the fact that the steel works used relatively little coal, and that natural gas is widely employed, the fuel consumption of 1887 may be roughly estimated at 5,000,000 tons. In 1880, 41,850,054 tons of bituminous coal gave employment to 100,116 men. We would have 12,500 men for the above quantity. Allowing for the introduction of coal-cutting machinery, &c., it may be put down at 10,000 men.

In 1880, 3142 men were employed in producing 5,359,489 tons of coke, of which 2,277,555 tons were consumed in iron works. In 1887 the consumption was probably not short of 6,000,000 tons, which would call for 3500 men engaged in the labor of converting coal into coke. The number of men employed in mining the coal for the coke may be roughly estimated as follows: Taking 63 per cent. as the yield of coal when making coke,

9,500,000 tons of coal would be required, which would call for about 20,000 men. Then there are at least 2000 men employed in quarrying limestone and over 1000 in making charcoal. We thus make the following total as a rough estimate:

	Hands.
Furnaces and rolling mills.....	193,000
Iron ore mining.....	50,600
Anthracite coal.....	10,000
Bituminous coal.....	10,000
Coking coal.....	3,500
Mining coal for coke.....	20,000
Quarrying limestone.....	2,000
Making charcoal.....	1,000
Total.....	290,100

It is safe to say that in raising the raw material from the ground and manufacturing into merchantable products the iron trade gives employment to about 290,000 men. This does not include any of the force employed in water or rail transportation. It does not embrace the wire mills, pipe works, foundries, boiler shops, bridge and structural-iron shops, &c.—

EDITOR.

Washington News.

(From Our Regular Correspondent.)

WASHINGTON, D. C., July 3, 1888.

The officers of the steel inspection service of the navy report that the supply of material for the cruisers Newark, Philadelphia and San Francisco and gunboats Concord and Bennington has been practically completed, and that those vessels will be ready for launching in a very short time. The cruiser Baltimore, at the Cramp yard, will be ready in about two weeks. The result of the completion of the hulls of this first batch of vessels has been of immense value to the metallurgical interests of the country. It has demonstrated that the United States Government is not dependent upon the steel-makers or the shipbuilders of foreign countries for the material or the ability to construct steel ships of war. In looking back to the beginning, and recalling with what almost despairing effort the manufacturers entered into the production of metal up to the standard requirements of the Navy Department, and how promptly they met the issue and triumphed in the best results in high-grade steel, we observe one of the greatest tributes to the energy, enterprise and skill of American producers. It is now said at the inspection office that the production of high quality steel is now accepted as a matter of course, and that the results show even greater skill in manufacture and application to other purposes.

The 6-inch steel cast gun is still undergoing the process of rifling and finishing at the Washington Naval Arsenal. It is not expected that it will be in condition to send to Annapolis much before September. The charge will be 50 pounds of powder and a 100-pound projectile. The greatest interest is manifested in ordnance circles as to how this gun will behave. It is now a question whether this gun shall be put to the statutory test only or be put to the full trial of its life by firing it until it bursts. Unless this be done the ultimate limit of its powers in this direction will be purely speculative. In a test of two 15-inch guns at Pittsburgh, one exploded at 500 rounds and the other at 550, firing as rapidly as the guns would be worked in action. The life of a cast-iron gun has been established at 1000 rounds and steel guns are expected to do even better work. In a cast-iron gun the closing of the right and opening of the left vent renews its effectiveness for an equal period.

The navy is now in possession of 5136 guns, including howitzers. A record of the work of each one has been preserved.

Of the new modern high-power steel guns 21 have been completed or practically so, and material for 148 has been ordered. The weights of these new guns, according to the ordnance figures, range as follows: 5 inch, 5000 pounds; 6 inch, 10,000 pounds; 8 inch, 27,000 pounds; 10 inch, 55,000 pounds; 12 inch, 100,000 pounds; and 16 inch, 100 tons. The latter sizes have, however, not yet been undertaken.

The two great armored ships will now soon be under way. The contracts for steel of the armored cruiser Maine, at the Brooklyn Navy Yard, to Carnegie, Phipps & Co., of Pittsburgh, show very satisfactory figures, viz., \$89,779 for steel plates, \$35,986 for steel shapes and \$9737 for steel rivets. The Pittsburgh Steel Casting Company furnish the steel castings for \$50,176. The contracts for hull material for the armored battle ship Texas will be awarded July 26. These will embrace plates, shapes, rivets and castings. The Texas will be built at the Norfolk Navy Yard. The naval officers are expecting the authorization of at least part, if not all, of the new ships provided for in the naval appropriation bills now before Congress. This will keep the work steadily moving along. By the end of the present year all the ships now contracted for will be afloat and ready for engines and armament.

The attack of Senator Gorman on the Ordnance Department of the army has naturally created a sensation. It was stated in official circles that most of what the Senator said was true. It is known that the ordnance branch of the army is far in the rear of the navy. The bold and aggressive stand of Senator Gorman will not stop at the burning of a little oratorical powder in the Senate. He will urge action upon the Department, where he expects to secure some changes which will bring this moribund branch into renewed youth and vigor.

A New Steel Company.—The Harvey Steel Company is a new organization which is about to purchase a site for a works at Jersey City, N. J., the organizers now having the refusal of two localities. The company consists of H. A. Harvey, president; Theodore Sturges, of the Oxford Iron and Nail Company, secretary; B. G. Clarke, of the Thomas Iron Company and the Lackawanna Coal and Iron Company, treasurer; Mr. Percy R. Pyne, of Moses Taylor & Co., being also interested in the concern. The company will build works to make steel under the patents of H. A. Harvey, who is well known as the inventor of machinery for the manufacture of cut and rolled wood screws.

The *Popular Science Monthly* describes a curious and ingenious device called "The Echo Maker," to be used on ships at sea. A flaring funnel is screwed to the muzzle of a rifle. When a supposed obstacle is near the vessel the rifle is fired in its direction, and if the obstacle is there the beam of sound projected through the funnel strikes the obstacle and rebounds, and as the echo is more or less perfect in proportion as the obstacle is more or less paralleled to the ship from which the gun is fired, and, as it is near or remote, the position of the obstacle may be inferred. The inventor claims that a sharp sound projected at or nearly at an object, and only when so directed, will in every case return some of the sound sent, so that, theoretically, there will always be an echo, and the difference in the time between the sound sent and the echo will indicate the remoteness of the object. The naval board tried the echo-maker and found that a return sound could be heard from the side of a fort $\frac{1}{4}$ mile away; from passing steamers $\frac{1}{4}$ mile off if broadside to; from bluffs and sails of vessels at about the same distance, and from spar buoys 200 yards away.

The Western Wages Contest.

The final meeting between the Conference committees of the Western Iron Association and the Amalgamated Association was held on Friday, the 29th ult., Mr. A. F. Keating presiding, and Messrs. James Neilson and William Martin acting as secretaries. Both sides argued in favor of the adoption of the scales presented by them. The manufacturers, through Mr. Keating, presented some additional facts and figures to show that it would be impossible for them to pay the present scale of wages and operate their mills. A detailed statement of prices obtained for their products now and prices obtained one year ago was presented which showed that a very great decline had taken place. Prospects for the coming year were also reported to be very discouraging. Orders are reported to be very scarce, while stocks on hand were reported to be very large. In view of these statements, which had been proven to the satisfaction of everybody present as representing the present condition of the market, the manufacturers would insist on the adoption of the scale previously presented by them. In behalf of the Amalgamated Association President Weihe stated that their people had submitted the case to the sub-lodges, and that a few of the manufacturers had been present at some of the meetings at which action was taken on the matter. The vote, he said, was nearly unanimous in favor of rejecting the proposition of the manufacturers. The lodges that did not vote to reject the scale left the matter in the hands of the Conference Committee. After Mr. Weihe had concluded the manufacturers retired. When they returned Chairman Keating reported that they had no further negotiation to offer, and adhered to their former scale. A motion was then made and carried to adjourn *sine die*. Secretary Martin, of the Amalgamated Association, stated that their scale would be printed and presented to the manufacturers for signature on Saturday, the 30th ult., in accordance with their usual custom. Those refusing to sign, their mills would suspend operations on that date. Notice has been received by Secretary Martin that two firms have already signed the scale, the Laughlin & Junction Steel Company, whose works are located at Mingo Junction, Ohio, and the Akron Iron Company, of Akron, Ohio, the latter concern employing about 500 men. A number of the concerns whose men are not controlled by the Amalgamated Association will continue in operation. Among these are the Black Diamond Steel Works, of Park, Brother & Co., Limited; Wm. Clarke, Son & Co.; the two mills of W. D. Wood & Co., Limited, at McKeesport, Pa., and Wellsville, Ohio; the Lake Erie Iron Company, of Cleveland, Ohio, and the steel works of Carnegie Brothers & Co., Limited, at Braddock, Pa. The Homestead Steel Works, of Carnegie, Phipps & Co., Limited, at Homestead, Pa., and the Twenty-ninth Street Iron Works, belonging to the same firm, also closed down on Saturday, the 30th ult., as did the Union Iron Works, of Carnegie Bros. & Co., Limited. Several conferences were held last week between President Weihe, of the Amalgamated Association, and General Manager R. W. Jones, of Carnegie Bros. & Co., Limited, for the purpose of arranging a steel scale for their works, but up to this time no scale has yet been prepared that is satisfactory to both sides, although it is so near adjustment that it will be signed at an early date. For the other works of Carnegie's outside of the Homestead mill the demands of the men have been acceded to after the adoption of modifications which are practically identical with those agreed to in the case

of Oliver Brothers & Phillips, to which we refer below. Both the Twenty-ninth Street Works of Carnegie, Phipps & Co. and the Union Iron Works of Carnegie Bros. & Co. start up Thursday.

A number of the manufacturers who were interviewed on the trouble all united in saying that they were better prepared this year than ever before to stand a lock-out, and that their mills would remain idle until their scale had been accepted. Job L. Boyer, of the Globe Rolling Mill Company, Cincinnati, Ohio, expressed his views on the situation as follows:

"The manufacturers are determined to insist on their scale. They have to do it. Necessity compels them. The iron mills of Pittsburgh haven't made any money during the past year; but they have been paying the 10 per cent. advance made last year. Now, when the situation is changed for the worse, the men are unwilling to come down. The Conference Committee admitted that one roller was making \$32 a day. I wouldn't care if I could make that myself. The head men are well paid, and probably can stand a lockout, but there is a host of laboring men who do not make more than from \$1.25 to \$1.50. These are the people who will suffer the most, but they are not considered. I must say that in Cincinnati we are not overstocked. I wish we had twice as much on hand as we have now. We will be satisfied, however, to shut down, because we have some repairs to make."

From present indications the lockout will be a prolonged one, although the situation is liable to change at any time. Considerable dissatisfaction is expressed both by the manufacturers and the public at the course pursued by the officials of the Amalgamated Association in refusing to meet the manufacturers half way in the matter and endeavor to arrange a compromise scale. Such a proposition was made by the manufacturers, but was rejected by the Amalgamated committee.

Oliver Brothers & Phillips signed the scale on Saturday, because they were obliged to keep their works running to fill a number of large contracts, among them one for a traction railroad. They signed after securing certain modifications. The item relating to crop ends was stricken out of the memorandum of agreement as follows: That for all crop ends on finishing mills used for merchantable purposes the same shall be paid for. The 1½ angles were changed from \$4.10 per ton to \$3.20 and 1¼ angles were changed from \$4.10 per ton to \$3.65, and the roll turners' scale was stricken out entirely. Oliver Brothers & Phillips' is a Clapp-Griffiths steel plant, and for the first time since it has been in operation a wage scale has been prepared and signed by the firm and the Amalgamated Association, which will govern the wages paid in these works. The scale is somewhat similar in its conditions to the iron scale, being in force from July 1, 1888, to July 1, 1889. There is one other Clapp-Griffiths steel works in Pittsburgh, and this is operated by the Spang Steel and Iron Company, the works being located at Etna, about 4 miles from that city. It is believed that a steel scale governing these works will also be agreed upon in a few days, and that no serious stoppage of the works will take place. This firm should not be confounded with that of Spang, Chalfant & Co., owners of the Etna Iron Works, also located at Etna. This firm have emphatically refused to sign the iron scale, and their works are closed down in all departments.

The other firms who have signed are P. H. Laufman & Co., Limited, of Apollo, Pa.; the Lockout Iron Company, of Chattanooga; the Findlay Iron and Steel Company, of Findlay, Ohio; the Aurora Iron and Steel Company, of Aurora, Ind.;

the Maumee Rolling Mill Company, of Toledo, Ohio; the Akron Iron Company, of Akron, Ohio, and the Republican Iron Company, of Pittsburgh. The latter starts up Thursday.

The trade is much divided on the question whether in reality any prolonged suspension of work is to follow. Although a good many manufacturers earnestly and sincerely believe that their only recourse in the present condition of the iron trade is to insist upon a reduction of wages, there are others who enter upon the contest with doubtful views as to its propriety. A leading manufacturer has stated that the low prices prevailing are due alone to the action of the manufacturers. It is stated that two weeks after the reduction of wages had been carried, the manufacturers would be as badly off as ever, since they would give away what they had secured in their efforts to secure business. It is not believed that the stoppage will have more effect than that which usually results from closing down for a few weeks to make repairs. Probably the first effect of a cessation of work for any length of time will be to relieve the Eastern markets of the pressure of competition from mills west of the Allegheny Mountains—a pressure which has been keenly felt during the past few months. At present relative prices East and West, even at cut rates of freight, very little if any iron can be sent West by Eastern mills. It would take a stoppage prolonged beyond July to lead to such shipments. Thus far only two important mills have signed the scale, the others being small, but stocks in the West are moderately large, and are regarded as ample enough to cover requirements for a few weeks. The opinion is expressed in the trade that the effect of the strike, if carried along through July, will be negative—that, in other words, it will avoid a further weakening, which would have followed the immediate signing of either scale.

Undervalued Steel Blooms.—A large quantity of imported steel blooms were sold on the 28th in New Albany, Ind., by the Custom authorities, for duties, freight, &c. This lot was a shipment on a sale of 5000 tons made some time since by Andres Joachams, of Charleroi, Belgium, to the New Albany Rail Mill Company. The rail mill bought the blooms at a very low price, through a local firm, acting as agent for the shipper, and the sample lot of about 20 tons came through the Custom House, undervalued, but the surveyor, knowing it to be only a sample, allowed it to pass, suspecting at the time some sharp trick. When the first regular shipment of about 400 tons came through, it was likewise undervalued, and was seized by the authorities for full duty, the rail mill having refused to pay the draft and receive the blooms, perceiving something crooked. Mr. Gathright, surveyor of the port of Louisville, states that Joachams has systematically defrauded numerous buyers through the country, the principal victim being a firm in Terre Haute, Ind., who, upon making a contract with Joachams for a heavy purchase of blooms, deposited a letter of credit in England, against which the shipper could draw with bill of lading attached. On each shipment after the papers had been officially approved, he would raise the amounts on the drafts, and, in this way, secured all the funds before half the goods were shipped. The entire lot in question was purchased by the Paddock-Hawley Iron Company, of St. Louis, for \$20.90 per ton, which is about \$8 below the market price, making about \$7000 including duty, charges and freight. The frauds of Joachams were first detected at the Louisville Custom House, and immediately reported to headquarters.

Foreign Markets.

EQUIVALENTS.

	Cents.
Franc, Peseta or Lira.....	19.3
Florin (Netherlands).....	40.2
Florin (Austria).....	35.9
Milreis (Portugal).....	51.8
Milreis (Brazil).....	23.8
Mark (Germany).....	Pounds.
Kilogram.....	220.5
Picul.....	134.

BRAZIL.

PARA. June 29, 1888.—*India Rubber.*—Our market has stiffened; there is little disposition to sell, the available supply not exceeding 20 tons. Receipts have been small, and are not expected to increase.—*Per cable direct.*

EAST INDIES.

MANILA, June 25, 1888.—*Hemp.*—There are buyers at \$8.31½ $\frac{1}{2}$ picul, against \$7.37½ same date last year, equaling $\frac{1}{2}$ ton, cost and freight, £28. 5/, against £25. 12/6. Clearances for the United States since last cable amounted to 8000 bales, against none last year, and since January 1 to 91,000 bales, as compared with 123,000 last year, the quantity loading being 8000, against none. Clearances for the United Kingdom, since January 1, have reached 168,000, against 98,000, while there are still loading 14,000, against 20,000; cleared for all other ports, 40,000, against 20,000; receipts at all ports since last cable, 15,000, against 9000; and since January 1, 298,000 bales, against 228,000 last year and 195,000 in 1886. *Freight*, \$5.50, against \$5, and *Exchange*, 3/5¼, against 3/5½ last year.—*Ker & Co. per cable direct to Chas. Nordhaus, New York.*

SINGAPORE, May 16, 1888.—*Tin.*—There have been no transactions in this market since the 2d inst., but in Penang business has been done for China up to \$35 $\frac{1}{2}$ picul. Sellers might accept \$40, and Chinese buyers would give \$35, but European shippers make no offers, and stocks in all quarters are accumulating. *Tonnage.*—Steamer rates to London are rather weaker, and a drop is not improbable. We quote weight at 27/6 @ 32/6. For New York via canal Tonnage is expected shortly, and some engagements are reported. Via Cape the Emily L. Boyd and W. Anton are offering room at 22/6 @ 25/, for weight. For Boston no fixture is yet reported. During the first four months shipments from the Straits to America were as follows during the years 1888 to 1883 respectively: 10,014 piculs, 28,004, 21,861, 12,689, 22,867 and 34,866. *Exchange* weak at 3/0¼.—*Gilfillan, Wood & Co.*

AUSTRALIA.

MELBOURNE, VICTORIA, June 15, 1888.—*Iron.*—The weakness in several articles has disappeared; all sell well at present at firm prices. We quote Galvanized Iron £17; Fence Wire, £10, and Scotch Pig, Clyde No. 1, £5.—*Per cable via Europe.*

MEXICO.

MEXICO, June 24, 1888.—*Drainage.*—The City Council has made a contract with the London-Mexican Prospecting and Finance Company for a 7 $\frac{1}{2}$ per cent. loan of £400,000, with 1 $\frac{1}{2}$ per cent. annuity sinking fund, at 82½, for the purpose of carrying out the drainage of the Valley of Mexico.—*La Libertad.*

JAPAN.

YOKOHAMA, May 10, 1888.—*Copper.*—The French syndicate have contracted for the output for three years of two of the leading Copper mines in Japan, amounting to seven-eighths of the total Japanese output. Baron Sadoine, the former general manager of Cockerill in Belgium, has recently visited China and Japan, and been instrumental in forming a Belgian syndicate for the extension of trade with Japan. The chief firms constituting such syndicate are the Angleur Steel Works, the Dyle-Bacalan Company, the Malines and Willebroeck Structural Iron Company, the Société Internationale de Construction, the metal firms Nicaise & Delcuve, Halot Frères, Caramin, Bael, and the Compagnie Générale des Conduites d'Eau.—*Echo.*

SPAIN.

BILBAO, June 16, 1888.—*Iron Ore.*—During the fortnight a better feeling has prevailed by degrees, leading to more doing. Still, business does not yet come up to what it was last year. Only a few single cargoes have been taken at 6/10 @ 7/8 Rubios and 7/6 @ 8/ Campanil. The latter is getting scarcer and scarcer through exhaustion; holders thereof are correspondingly firm. Total shipments since January 1 sum up 1,748,158 tons, against 2,113,369 same time last year. *Pig Iron* has been moderately active; the week's export has been 1749 tons, while 659 tons have been shipped coastwise.—*Bilbao Marítimo y Comercial.*

SWEDEN.

STOCKHOLM, June 21, 1888.—*Iron.*—At the instigation of the Swedish Export Association the sales office of Swedish Ironmasters has resolved to send a special agent to China and the East for the purpose of pushing in that direction the export of Swedish Iron.—*Dag-bladet.*

GERMANY.

HAMBURG, June 23, 1888.—*Iron.*—The scarcity and high price of Iron Ore at Siegen and Nassau sustains the Pig Iron quotations. The demand for Spiegel has been rather on the increase. Forge Pig has, on the other hand, been duller, yet sustained. Orders extend to September 1 next. Stocks are not large and not being increased just now, as the taking of inventories impends. Foundry Pig has remained as firm as before. Thomas sells with greater ease than Bessemer, but the latter still brings 54 @ 54.40 marks. Luxembourg is bringing 34 @ 38; English Bessemer, 42/ on the West Coast. Merchant is quiet, with a slightly improved domestic demand; still, production will have to be curtailed, the export still dragging, though perhaps slightly better. The demand for Boiler Plates is, if possible, brisker than at any previous time and prices have been raised to 170 marks and for Tank Plates to 150. Wire Rods for export have been reduced 5 marks $\frac{1}{2}$ ton, to facilitate exportation. The Wire-Nail convention has been prolonged, but it does not include the few leading concerns. Railway cars are doing well. Negotiations for the renewal of the Steel-Rail syndicate continue unabated. Advices both as regards Iron and Steel from Upper Silesia are of the most reassuring nature. *Metals.*—Lead has become very lively here and is looking up.—*Borsenhalle.*

Silicon in Tool Steel.

Dr. Friedrich C. G. Mueller, of Brandenburg, Germany, who has acquired the reputation of being among the leading authorities on metallurgical subjects in Germany, has lately added to his earlier investigations, the results being published in *Stahl und Eisen*, on crucible steel. He has probably been the first to call attention to the importance of silicon in the manufacture of that class of steel. In spite of the fact that it is well known that the best Sheffield steel often contains as much as 0.5 per cent. of silicon, some prejudice has existed against its presence in any quantity. Dr. Mueller determined to investigate the matter, and with the aid of Felix Bischoff, a steel maker of Duisburg, Germany, made and tested a series of high silicon steels, by additions of 15 per cent. ferrosilicon. Unfortunately the presence of 0.2 per cent. of phosphorus in this material made it impossible to use more than small quantities of it. Dannemora stock was used, containing only faint traces of sulphur, 0.006 per cent. of copper and 0.015 per cent. of phosphorus.

First four soft samples of steel were made for wood-working machinery, being hammered down to 1.77 to 0.24 flats. All of them were used for 10 months in planers in a factory for making picture frames, the foreman reporting that they were equal to the best English steel, and that no difference could be observed in grinding or working except that samples A and A' were a little harder. The chemical analysis of the samples showed the following compositions:

	Carbon.	Silicon.	Man-ganese.	Phos-phorus.
A.....	0.793	0.342	0.37	.....
A'.....	0.826	0.840	0.43	.....
B.....	0.6 (color test)	0.193	0.27	.....
B'.....	0.574	0.478	0.30	0.019

A more extended series of experiments made with silicon steel in the machine shop of Gebrueder Wiemann. A good hand at the lathe, skilled in preparing his tools, was given 1.18 inch square boss, with arbitrary marks. Both the proprietor of the works and Dr. Mueller watched his work constantly. The material for the analyses was taken by drilling from the tools in use so that Dr. Mueller knew their composition only after their behavior in work was known. Steels C and C', both inclusive, were made from the best, Danne-

mora stock, G being produced from cheaper Swedish stock for ordinary goods. This steel was tested with the object of ascertaining whether the effect of phosphorus becomes noticeable when it goes beyond 0.02. Finally analysis H represents the steel usually employed in the shop, bearing the name of a well-known Austrian maker.

	Carbon.	Silicon.	Man-ganese.	Phos-phorus.
C.....	1.050	0.229	0.41	0.015
C'.....	1.075	0.695	0.52	0.023
D.....	1.188	0.575	0.40	0.018
E.....	1.091	0.630	0.37	0.019
F.....	1.114	0.684	0.40	.....
G.....	0.941	0.377	0.36	0.028
H.....	1.017	0.228	0.32	0.024

All the samples were used for 15 months in doing work of the most varying kind in the lathe on iron, steel and cast iron. All proved to be first quality, D being the best, followed closely by E, which is a little softer. Both of them are ahead of anything yet known at the shop. Whenever larger contract work is to be done they are taken out and a depth of cut and speed is used with them which is otherwise considered dangerous. In cutting V-screws the point of the tool stands four times longer than with ordinary steel.

Steels C and C' are not far behind, C appearing to be a little more brittle. It is worthy of note that in these tests the slightly higher phosphorus contents of G did not effect it injuriously as far as observation went. Accidentally a surprising observation was made. A sample of the soft wood-planing tool-steel B' was kept at the machine shop. Without Dr. Mueller's knowledge it was used for a lathe tool and it was reported that a steam cylinder had been bored out with it, the edge remaining intact after 18 hours' work. Some mistake in marking was suspected, but a color test for carbon showed 0.6 per cent. and the silicon analysis proved that it was the identical steel. Afterward the same steel was used for working iron, and chiefly on screws, the report being that it was equal to C and C'.

The result of these investigations would indicate that silicon, to the extent of 0.8 per cent., has no deleterious influence upon the quality of crucible tool steel, and it may be true that 0.5 to 0.6 per cent. of silicon actually improves the quality.

Iron Ore at Wausau, Wis.—A large deposit of iron ore has been opened up near Wausau, in the central part of Wisconsin, which is reported to contain 67 per cent. of metallic iron and to be low in sulphur and phosphorus. The first train-load of ore was shipped from the mines on the 26th ult., and the occasion was celebrated by the citizens of the town with great enthusiasm. Ninety carts were loaded with ore, to be hauled to the cars, and the citizens formed in procession behind them and marched to the railroad, while a band took the lead of the line. After the ore had been formally loaded the party marched to a hall and partook of a banquet.

A correspondent of the United States *Army and Navy Journal* asks: "What is the longest piece of ordnance that has ever been successfully fired?" and receives the following answer. "If you include in the term ordnance everything that carries a projectile, we should answer 14 miles. This is the straight tube conveying natural gas from Murrayville to Pittsburgh. To clear this tube out a projectile known as the 'gum-ball' was inserted in the end at the gas well, closely fitting the interior; the gas was then turned on full force and the gum-ball fired through its full length, coming out at the further end in a few minutes."

In the construction of the Eiffel tower, at Paris, 2,500,000 rivets will be used.

Recent Legal Decisions.

TAXATION OF GOODS—COAL IN BARGES.

A coal company in Pennsylvania sent their coal down to Louisiana in barges for sale there; the coal was not consigned to any one, and the company had no agent there. The sheriff of one of the parishes levied on the coal which was in the barges in the Mississippi, it not having been landed, to sell it for the taxes which had been assessed upon it as property in the State. The company brought suit for an injunction to restrain the sale—Pittsburgh and Southern Coal Company *vs.* Bates—on the ground that the law directing the taxation was in violation of the commerce clause of the Federal Constitution. A preliminary injunction was granted, but on the hearing the suit was dismissed, and on the appeal taken to the Supreme Court of Louisiana the judgment below was affirmed. The chief justice, Bermudez, in the opinion, said: "Unnecessary pains have been taken to establish the elementary proposition that goods in transit from one State to another cannot be lawful objects of taxation during their passage in transportation in the State and through the States lying between that of the origin and that of the destination of the goods. There is no doubt that such goods cannot be taxed. But this coal is not in transit. The facts that it was kept on board the barges, or flats, which carried it, and was not unloaded, nor consigned, and that the company had no special agent in the State for its sale, are not material. It was sent down the Mississippi River to supply the Louisiana trade, and it reached its destination, and was offered for sale, and sold in part, and the rest is now for sale. In the case of *Brown vs. Houston* the Supreme Court of the United States decided that goods become the lawful objects of taxation the moment they reach their destination, where the statute provides for such taxation, for it cannot be seriously contended, at least in the absence of an act of Congress, that all goods which are the product of other States are to be free from taxation in the States to which they may be carried for use or sale. It is clear that this coal had become intermingled, on its arrival here, with the general property in the State of Louisiana, and is subject here, as all other personal property is, to taxation."

PARTNERSHIP DISSOLUTION.

P. & W. were partners and they dissolved their firm, with authority to each to sign in liquidation, and the notice of dissolution was published in the neighborhood paper. P. subsequently indorsed a note made by his brother "P. & W. in liquidation," and when it was not paid the holder, W., brought suit upon it and sought to hold the firm as indorser. W. defended on the ground that as the indorsement was made for the accommodation of P.'s brother, and not for the partnership purposes, he was not liable, he not having ratified the act of indorsement; but he was defeated because of the charge of the court, who said: "A note executed or indorsed by a partnership, whether during the existence thereof, or in liquidation by a partner authorized to use the firm-name in liquidation, is presumptively the act of the firm, and it devolves upon any member of the present or late firm who is sued upon it to show that it was not used for partnership purposes." The case, *Woodson vs. Wood*, on appeal to the Supreme Court of Appeals of Virginia was reversed. Judge Lacy, in the opinion, said: "If authorized verbally or in writing one of the former partners may bind the firm, after dissolution, as a party to a bill or note, but authority to settle or close up the business of a firm does not imply author-

ity to one partner, after dissolution, to give a note in the name of the firm for the firm's debt, or to renew one given before dissolution. Nor will authority to give or renew a note be implied by authority 'to settle business of the firm and sign its name for that purpose,' to use the name of the firm in liquidation of 'its past business,' or by the use of any similar expression. The instruction of the trial court was in conflict with the decisions on this question. Besides, it has been held that an indorsement on a note by a firm in liquidation is notice of the dissolution of the firm, which, of course, implies that a partner cannot be held as a partner; under the general law of partnership, for the acts of his former partner. The judgment must be reversed."

CONSIGNMENTS—BILLS OF LADING, WITH DRAFTS.

W, a produce dealer, at Batavia, N. Y., had for several years been in the habit of sending his property to Ege & Otis, commission merchants, New York City, to be sold by them. He consigned the produce and sent to them the original bill of lading; but he took from the railroad company a duplicate bill of lading, to which he attached a draft as against it, and had this draft discounted at a bank in Batavia. The drafts were often drawn without any particular regard to the value of the property described in the bills attached to them. This was the general course of business pursued by all of the parties, consignor, consignees and bank, and was acquiesced in. Between September 29, 1879, and February 18, 1880, W. made 145 consignments and drew 145 drafts; the first 135 drafts amounted to \$53,725, were accepted and paid and the entire consignment yielded but \$52,065.52. The last ten drafts were not honored, though the duplicate bills of lading were attached to them, and the bank brought an action of conversion for the value of the property represented by the bills of lading, as the consignees had appropriated it to their own use in payment of the overdrafts of the consignee. The bank contended that the consignees had no right to apply the proceeds of the sales of the property sent on these ten bills of lading to the payment of liabilities incurred through the acceptance of previous drafts. Plaintiff had judgment in this case—*First National Bank of Batavia vs. Ege*—for the value of the property, and the defendants appealed to the Court of Appeals, of New York, where the judgment was affirmed. The chief justice, Ruger, in the opinion, said: "We think that the contention of the plaintiff is the correct view of the question before us. The practice of carriers in issuing duplicate bills of lading to consignor for property shipped for sale has been much disapproved of by the courts, for the reason that it affords a convenient opportunity for the commission of frauds by consignors, as well as subjecting the carrier to the hazard of making incorrect delivery of the property. No question, however, arises in this case over conflicting claims between holders of respective bills of lading, as there can be no claim that defendants acquired title to the property consigned by virtue of the receipt of any bills by them. The possession of these bills gave defendants no title to the property described therein, but simply conferred the right upon them to receive it from the carrier, and hold it subject to an accounting with the consignor when sold, or to the owner when he should appear. By taking a transfer of a bill of lading from the consignor, and discounting a draft upon the faith thereof, the plaintiff acquired title to the property described therein, to the extent of the draft discounted, paramount to the claims of any other party. This would clearly be so unless such party had in good faith parted

with value in reliance upon the possession of the property lawfully acquired. When a consignee of property to sell accepts drafts upon the faith of the consignment, he acquires the right to sell the property, and apply its proceeds in payment of such drafts; but if such proceeds are insufficient for such purpose, he must rely upon the responsibility alone of the drawer to repay any deficiency. By the mere receipt of any subsequent shipment he acquires no lien thereon to the prejudice of those who have advanced money upon them, and taken transfer of bills of lading to secure such advances."

INDORSER—NOTICE OF PROTEST.

B. sued P. as an indorser upon a promissory note, and the declaration set out that no notice of dishonor was served upon P. upon the failure of the maker of the note to pay, because the note was made for the accommodation of P. A demurrer was filed and overruled in the case—*Blenderman vs. Price*—by the Supreme Court of New Jersey, and Judge Reed, in the opinion, said: "An accommodation note made for the convenience of the indorser, who alone has the interest to pay it, as between himself and the maker, and who must ultimately pay the note, is not entitled to notice of payment."

TRADE FIXTURES—RENEWAL OF LEASE.

A hotel was rented to C. by R. and he occupied it for 12 years, until 1880, when R. gave him notice to quit at the end of the year, but he did not give up the property. He took a written lease for five years, but in it there was no reference made to the fixtures he had put on the place during his tenancy just then expiring. The fixtures were such as are known in law as "trade fixtures." In 1882 C. died and bequeathed his interest in the lease to his wife, who continued the business until the expiration of the term, when she gave up the premises, and was about to remove these "trade fixtures." R. got an injunction to prevent the removal of these fixtures, claiming that they had been abandoned to him on the making of the new lease in 1880, and Mrs. C. carried the case—*Carlin vs. Ritter*—to the Court of Appeals of Maryland, where the judgment was affirmed. Judge Miller, in the opinion, said: "Under the decision it is clear that these fixtures were abandoned to the landlord. A tenant to protect his right to trade fixtures must secure his ownership during his term by removal or agreement."

The property of the Wynn Coke and Mining Company, near Uniontown, Pa., has been levied on by the Sheriff at the suit of the First National Bank of Uniontown on a claim of \$4100, money loaned the coke company. Labor claims for unpaid wages to the amount of \$1500 have also been filed, while a mortgage appears entered for \$9000. The works are near Oliphant furnace and are supposed to be worth \$25,000, comprising 85 acres of coal, 75 coke ovens and other property. The trouble was precipitated by the disappearance of A. B. de Saulles, the principal owner of the works.

The Pittsburgh coal operators are now considering the advisability of founding a pool by which retailers can only buy from members, also that all sales be registered at headquarters of the pool, and the latter will practically, like the coke syndicate, now defunct, make all sales.

The Deane Steam Pump Company will supply two pumps, each with a capacity of 2,000,000 gallons in 24 hours, for the seven Hale elevators that are to go into the new Lionberger building at Eighth and Washington avenue, St. Louis, Mo.

TRADE REPORT.

Pittsburgh.

Office of *The Iron Age*, 77 Fourth Avenue, {
Pittsburgh, Pa., July 2, 1888. }

The big lockout of the Iron workers has at last been inaugurated, and, with very few exceptions, the mills not only here in Pittsburgh but in the Ohio, Shenango and Mahoning valleys have been shut down. The Conference Committees had repeated conferences, and strong efforts were made to arrive at an understanding, but without avail; both sides refused to make any material concession, and a shut-down, therefore, was unavoidable. The Iron workers, or at least some of them, appear to be well satisfied with the situation, saying that they have for some years been advocating a vacation of a couple of months during the hot season, and they argue that it will be an advantage to the manufacturers, that it will enable them to work off their surplus stock and obtain better prices. Manufacturers, almost without exception, are determined to have cheaper labor or better prices for their product, even if for a time they do lose some of their trade to Eastern competitors. Pittsburgh manufacturers complain that they have been compelled to pay too much for skilled labor for several years; that they could not successfully compete with Eastern manufacturers who had a decided advantage over them in this respect. Dispatches have been received by mill owners at Youngstown, Ironton, and other points, stating that they also have shut down and will stand firmly with the Pittsburghers. This is perhaps the biggest shut-down ever attempted in this country, and it will be watched with a good deal of interest by business men. The Amalgamated managers appear to have but little doubt but what the manufacturers, after being idle for a time, will become restive at seeing trade going elsewhere, and that they will be ready and willing to accept the scale presented by the Amalgamated Association. The shut-down, it is said, will throw some 14,000 Iron workers out of employment, and will require a good deal of money and heavy assessments to keep up the strike.

Pig Iron.—There is no demand for Mill Irons, nor is it likely that there will be while the lock-out continues; the outlook is very discouraging for furnacemen, and some not already out will blow out their furnaces just as soon as they work what they have on hand. The demand for Bessemer appears to have fallen off, and it is evident that large buyers on the market the past two or three weeks have been supplied; prices, however, are still maintained at the recent advance. We can report a sale of 1000 tons at \$17.25, four months, which may be regarded as the milling price for standard brands. Foundry Irons continue dull. Not for many years has the market here been in so bad a condition as at present, and the outlook is not bright for an early improvement. All the Iron taken by the foundries and Steel works is scarcely a drop in the bucket as compared with the consumption of Mill Irons. Mill owners have been buying little or no Iron for some time past, and it is certain, now that their mills are stopped, they will buy none at all. We quote prices as follows:

Neutral Gray Forge.....	\$14.00 @ \$14.50, cash.
All Ore Mill.....	15.00 @ 15.50 "
White and Mottled.....	13.50 @ 14.00 "
No. 1 Foundry.....	16.50 @ 16.75 "
No. 2 Foundry.....	15.75 @ 16.00 "
No. 1 All-Ore Foundry.....	17.00 @ 17.25 "
Charcoal Foundry.....	22.00 @ 24.00 "
Cold Blast Charcoal.....	25.00 @ 26.00 "
Bessemer.....	17.00 @ 17.15 "

Muck Bar.—Continues dull and prices are nominal at \$26 @ \$26.50, cash. There is little or no demand.

Manufactured Iron.—Some mill owners managed to work up a fair stock of Assorted Iron before shutting down, while others were less fortunate. However, as the demand is exceedingly light, it is probable that manufacturers will be able to meet the wants of their customers for some time to come. Prices remain unchanged, and we continue to quote upon a basis of \$1.70 @ \$1.80 for Bars, 60 days, 2% off for cash.

Nails.—There is little or no change to note in the Nail market. Trade continues slow and very unsatisfactory, while prices remain unchanged at \$1.90 for 12d to 40d in carlots and upward, and 10¢ per keg additional for small lots. It is intimated that the card price is being "cut," but to what extent or whether it is so or not we cannot state.

Wrought Iron Pipe.—Trade has not improved since our last report; if anything, it is growing worse instead of better. But few, if any, of the mills are working up to anything like their full capacity. Some are standing idle. As to prices, they are too unsettled and irregular to quote.

Old Rails.—Like Pig Iron, are very dull; demand has been exceedingly light for some time past, and there will be no improvement as long as the mills are standing idle. However, stocks are by no means excessive, and prices remain as last quoted: \$21 @ \$21.50 for American T's. There is some inquiry for Old Steel Rails, with but few offers.

Steel Rails.—The Edgar Thomson Works are still working full time, and it is said have enough orders booked to keep them going for 60 days. Prices are quoted at \$31 @ \$31.50, cash, at mill.

Billets, &c.—There is a fair business in Bessemer Steel Billets, which may be quoted at \$28, cash, at makers' works in Pittsburgh. Nail Slabs, \$27.50 @ \$27.75 at makers' works. Sale of Domestic Crop Ends at \$17.25, cash.

Merchant Steel.—There was a meeting of the Bessemer Steel men a few days ago, but there was no change made in prices. Tool Steel, 8½¢; Crucible Spring, 4½¢; do. Machinery, 5¢; Open-Hearth Machinery, 5¢. The Steel works of Singer, Nimick & Co., have been closed, the employees refusing to accept a reduction in wages of 10%.

Railway Track Supplies.—Continue dull, while prices remain unchanged: Spikes, 2¢ @ 2.10¢, 30 days, delivered; Spike Bars, 1.75¢ @ 1.85¢; Track Bolts, 2.85¢ with Square and 2.95¢ with Hexagon Nuts.

Old Material.—Of all kinds is dull and prices are weak and in buyers' favor. No. 1 Wrought Scrap, \$19 @ \$20, net ton; Wrought Turnings, \$12 @ \$13; Car Axles, \$23 @ \$24; Cast Scrap, \$15 @ \$15.50, gross; Cast Borings, \$11.50 @ \$12; Old Car-Wheels, nominal at \$19 @ \$20.

Chicago.

Office of *The Iron Age*, 95 and 97 Washington St., {
Chicago, July 2, 1888. }

Pig Iron.—The market generally has been inactive, although sales of a considerable quantity of Bessemer and Southern Coke Pig are reported. Less is being heard now of the competition of the cheapest grades of Southern Iron, as the supply has been largely absorbed here and at other centers of consumption. Advices from Cincinnati, privately received, state that fully 20,000 tons more of No. 2 Mill could have been sold there last week if it could have been obtained. The cleaning up of this grade of Iron removes a serious

element in the demoralization of prices, and the effect is already seen in several directions. A sale of No. 1 Southern Coke is reported on good authority to have been made at \$17.75, cash, f.o.b. Chicago, which indicates a return to better prices. Freight rates on Pig from Southern points were also restored on the 25th ult. to within 15¢ of the rates ruling before the recent cut. Lake Superior Charcoal and Ohio Softeners are not moving freely at present, but inquiries from manufacturers of Agricultural Implements are being received, and it is intimated that the excellent crop prospects will make the demand from this class of consumers heavier than usual. Quotations are as follows, for cash, f.o.b. Chicago: Lake Superior Charcoal, all numbers, \$19 @ \$19.50; Alabama Car-Wheel, Nos. 1 and 2, \$25.25; do., Nos. 3 to 6, \$26.25; Southern Charcoal Foundry, No. 1, \$18; Jackson County Softeners, No. 1, \$17.75 @ \$18; Hocking Valley, Soft Foundry, No. 1, \$16.50 @ \$17.50; American Scotch (Blackband) No. 1, \$18.50 @ \$19.50; other Ohio Scotch Irons, No. 1, \$17.50 @ \$18; Lake Superior Coke, No. 1, \$17 @ \$17.50; No. 2, \$16 @ \$16.50; No. 3, \$15 @ \$15.50; Southern Coke, No. 2, \$17 @ \$17.25; No. 2½ and Open Bright, \$16.50; No. 3, \$15.50; No. 1 Mill, \$14.50 @ \$15.50.

Bar Iron.—Some of the agricultural implement manufacturers are asking for quotations on a full year's supply, but beyond this nothing has occurred worthy of note. Prices are irregular, with the possibility of a long stoppage of Western mills, and although some brands of Common Iron can be had at 1.60¢, f.o.b. Chicago, half extras, most sellers are quoting 1.62½¢ @ 1.65¢, subject to strike. Prices from store are still 1.70 @ 2¢, according to quantity and quality.

Structural Iron.—The prominent feature of this branch of trade is the increasing number of orders for bridgework, the season now being fairly opened. Beams for building purposes are also selling well in a retail way. Store prices for Angles are: 2.40¢ @ 2.70¢; Tees, 2.60¢ @ 2.90¢; Beams and Channels, 3.80¢. Prices on carload lots from mill, f.o.b. Chicago, are as follows: Angles, 2.12½¢; Universal Plates, 2.17½¢; Tees, 2.42½¢; Beams, 3.40¢.

Plates, Tubes, &c.—The Plate trade has been very satisfactory both in small lots and mill orders. In fact, the business of the entire month has been above complaint, the leading dealers reporting a considerable gain in value, which, of course, means a heavy gain in tonnage over the corresponding month of last year. Prices are strong with an upward tendency, as follows: Heavy Sheets, Nos. 10 to 14, 2.60¢ @ 2.70¢; Tank Iron, 2.50¢ @ 2.60¢; Tank Steel, 2.75¢ @ 3¢; Shell Iron, 3¢; Shell Steel, 3¢ @ 3.25¢; Flange Iron and Steel, 4¢; Fire-Box Steel, 4.75¢ @ 5.75¢; Boiler Rivets, 4¢ @ 4.25¢; Ulster Iron, 3.75¢; Boiler Tubes, 60% and 10% off on 2½-inch and larger and 62½% off on 2-inch and smaller. The low prices on Tubes are attracting buyers and increasing sales are reported, but manufacturers are chary about taking large orders at these rates.

Sheet Iron.—Another week of good business is reported by the agents of such mills as are able to take orders, and they now quote No. 27 Common Black at 2.90¢, f.o.b. Chicago. Store prices are unchanged at 3.30¢ for No. 27. If the Western mills are closed for any considerable length of time by the wages controversy, prices will inevitably advance materially.

Galvanized Iron.—Although the legitimate demand is about the same as it has been, apprehensions of a long stoppage of the mills are causing increased inquiry

from buyers. Manufacturers' agents are, however, in no haste to dispose of their spot stocks and are withdrawing special cash discounts. Small lots are quoted at 60 % and 5 % off for Juniata and 60 % and 10 % off for Charcoal.

Merchant Steel.—Business is quiet, with no change in prices.

Steel Rails.—So far as can be ascertained, no orders of importance have been placed here during the week. Negotiations are pending for round lots with some prospect of an early decision. Orders are known to have gone East recently because deliveries could not be arranged by local mills to suit purchasers. Indications favor an increased business for the fall months, but prices show no improvement. Quotations are still \$31.50 @ \$32.

Old Rails and Wheels.—Holders of Old Iron Rails are asking \$19, but the mills are not inclined to buy with the prospect of a general stoppage of work, so that no transactions are reported. Old Car Wheels are in slight demand at about \$19. The only sale coming to light is one of 200 tons by a railroad company direct to a consumer at \$18.50.

Scrap.—With very light transactions, quotations are nominal. Mixed Country Scrap is still worth about \$12, while dealers' selling quotations range about as follows, per ton of 2000 lb: No. 1 Forge, \$17 @ \$17.50; Track, \$16; No. 1 Mill, \$12; Light Wrought, \$8.50 @ \$9; Horseshoes, \$15.50; Axles, \$21.50 @ \$22; Cast Machinery, \$12.50 @ \$13; Stove Plate, \$9; Cast Borings, \$8.25; Wrought Turnings, \$9; Axle Turnings, \$11; Coil Steel, \$13; Leaf Steel, \$14; Locomotive Tires, \$13.

Hardware.—Jobbers have found the business of the week excellent for the season. All kinds of goods have been in demand, particularly Builders' Hardware. A great deal of building is going on in many of the Northwestern towns. A very heavy business was done in June in Window and Door Fly Screens, exceeding that of any former season. Collections are good, being reported fully up to the average.

Nails.—Manufacturers' agents report the demand slightly reviving, some fair sales having been made during the week to large buyers. Prices have receded a little, Steel Cut Nails now being quoted at \$1.90, f.o.b. Chicago, from factory. Jobbers have experienced a very good trade in both Cut and Wire Nails, activity in building causing a demand for quick consumption. They quote small lots at \$2.05 @ \$2.10 for Steel and \$2.50 @ \$2.55 for Wire Nails.

Barb Wire.—Jobbers report but light sales, farmers now being actively employed in attending to growing crops and not building fences. They quote small lots at 3¢ @ 3.10¢ for Painted and 3.75¢ for Galvanized.

Forsyth, Hyde & Co., of Chicago, have been appointed sales agents for the Northwest for the Brierfield Iron and Coal Company, of Brierfield, Ala., makers of the Bibb brand of Coke Pig Iron.

The North Chicago Rolling Mill Company, of Chicago and Milwaukee, have issued a very acceptable pamphlet to the Iron trade. It contains 20 pages, is of vest-pocket size, and is covered with heavy paper, having lithographic designs on the front and back. The contents embrace, first, a list of the sizes of Flats, Half Ovals, Half Rounds, Car-Truck Channels, Ovals, Wagon-Box Irons, Rounds, Squares, Car-Link and Car-Tin Irons and Angles rolled at Milwaukee, June 1, 1888; second, the standard list of extras on Bar Iron; third, list of sizes of Steel Plow-Beam Billets,

Steel Cultivator Beams, Light Iron and Steel Rails from 8 to 35 pounds, Splices and Bolts, Steel Street Rails, O. G. Tires, Fish Plates, Car Iron, &c., made at Milwaukee; fourth, the Steel classification of extras adopted by the Bessemer Merchant Steel Association, December 1, 1887; fifth, the new national Cut Nail schedule adopted June 6, 1888; sixth, tables showing number of Cut Nails to the pound and lengths of various sizes, tons per mile of Rails of various weights, weight of rolled Iron (round, square and flat), and information regarding railway supplies used in laying track; seventh, description of Bay View Pig Iron. The North Chicago Rolling Mill Company, established in 1857, now have a capital of \$6,000,000 and operate blast furnaces and a Steel Rail mill at North Chicago, Ill., blast furnaces and a Steel Rail mill at South Chicago, Ill., and blast furnaces, bar mills, Nail factory, puddle mill and Fish-Plate mill at Milwaukee, Wis., with a total annual capacity of 100,000 tons of Bar Iron and Fish Plates, 400,000 tons of Pig Metal, 350,000 tons of Steel and Iron Rails and 15,000 tons (300,000 kegs) of Nails.

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St., PHILADELPHIA, PA., July 3, 1888.

Pig Iron.—The close of the first half of 1888 shows it to have been a most unsatisfactory one to the makers of Pig Iron. Prices opened at from \$20.50 to \$21 at tide for No. 1 Foundry, and at about \$17 for Gray Forge, drooping from that time to the present without a single reaction, although the most important declines were in May and June. These changes are largely due to a natural reaction from the extraordinary activity of 1886 and 1887, although tariff agitation and the political position generally precludes the possibility of any important ventures being taken up at present. Who, for instance, is willing to take the risk of entering into a large contract, while there is a possibility of foreign material being brought in at several dollars per ton less than American Iron can be made for? Another reason for the steady decline is the encroachments made by Southern and Western Irons. Whatever prices were made for Lehigh or Schuylkill Irons early in the year were almost invariably cut under by furnaces at a distance. Western irons have made the biggest inroads, and are now the most serious competitors owing to their superior quality. Southern Irons were heavily sold earlier in the season, but since the price of Pennsylvania brands have been cut down there is comparatively but little competition, and sales during the past three or four weeks of no importance whatever. It is understood, however, that several new furnaces (Alabama) are to be blown in some time within the next six or eight weeks; and it is therefore not unlikely that a portion of the output will find its way to this market, although to start in with it will have to be at very low prices. It is a peculiar feature that during the earlier periods of manufacture in the South a good deal of the product comes this way, but later on they find a market for it at home, or else displace Iron in the West, which in its turn finds its way into Eastern markets. In regard to the future, the outlook is not such as can be very clearly defined. In some respects there are encouraging features, in others quite the reverse. For several days past the feeling has been gradually veering around toward improvement, and at this writing the tone is hopeful, although somewhat nervous, owing to the uncertainty of things in the West, and in regard to the tariff. On the bright side, we find light stocks, and a demand

pretty well up to the current output, very low prices, and prospects that favor expectations of an increasing consumption as the season advances. A large amount of business is said to be waiting for a decision in regard to the tariff, while the ordinary demand promises to be at least equal to that of the first half of the year. The situation in the West is not regarded as likely to be serious, and it is believed that by the middle of the month work will be going on as usual. Assuming that this will be the case, and that tariff matters will also be satisfactorily arranged, the chances seem to favor gradual improvement, while in the event of a change in the administration a decided and marked advance all along the line might very safely be predicted. On the other hand, a protracted suspension of work in the West, or any material changes in the tariff, would be just as certain to act unfavorably on Pig Iron, and more or less demoralize the entire market. So long as these matters are unsettled operations will virtually be kept within the smallest limits possible; and as no human foresight can determine for certain what the outcome will be, it is not to be expected that things can be other than they are—nervous and unsettled. The current output of Pig Iron is estimated to be about 10,000 tons per week less than it was six months ago; and as there are no intimations of any important increase so long as the present low prices rule, stocks will in all probability be kept well under control. The first quarter of the year passed without any quotable change in prices, but toward the end of April a good deal of weakness was manifested, and orders were placed at about 50¢ per ton reduction. By the middle of May the Thomas Iron Company announced \$2 reduction on Foundry Irons, since which date, up to about the middle of June, the market was unsettled and weak, but about that time the adjustment of values seemed to be complete and each brand settled to a point beyond which concessions were firmly refused. Since that date to the present the feeling has been of a more settled character, and, in the absence of new elements of disturbance, the general opinion is that the tendency will be slowly, perhaps, but surely, toward improvement. Prices to-day range from \$18 to \$19 at tide for No. 1 Foundry, \$17 @ \$17.50 for No. 2, and \$15.50 @ \$16.50 for Gray Forge, according to brand, quantity, delivery, &c.

Manufactured Iron.—The remarks made in regard to Pig Iron would apply almost equally well under this heading. Prices seemed to have varied with the raw material, being without quotable change during the first three months, but steadily weakening after that up to within about two weeks ago. The falling off in consumption has been very great, compared with either the first half or the last half of the previous year, which statement fully explains the continuous weakness in prices. Each mill naturally tried to run full time, and, in attempts to secure business, prices have been cut almost to the lowest on record. In addition to this, competition from the West has been very strong, and many of the largest orders were carried off, chiefly by Pittsburgh concerns. The result has been unremunerative prices and unwillingness on the part of consumers to take more than small lots at a time, fearing that quotations might go still lower before the reaction came. The falling off in consumption has been largest in Skelp Iron, although the Bar trade has suffered to some extent. Tank Iron, too, has been in very light demand, although Ship Plate and Boiler Iron have in some measure offset the loss, the demand for that class of material having been very satisfactory. But the constant urgency to sell has kept prices at a low point, and if first cost has

been cleared during the past three months it is about all that can be expected. The outlook seems to be a little better at the moment, but until there is some certainty in regard to the outcome of the labor question in the West it is impossible to form any definite opinion on the subject. Meanwhile sellers ask about \$1 75 ton advance, but would not be likely to accept large orders even then. A general resumption of work in the West, however, would act unfavorably, as buyers easily take fright. A suspension for three or four weeks would probably place things on a firm basis, as the disposition is to take a cheerful view of things, which would be vastly improved providing the pressure to sell was removed for a short time. The highest quotations appear to have been made during January, Bars at 1.95¢; ordinary Plates, 2.15¢ and Grooved Skelp, 1.9¢ @ 1.95¢. During April, May and June Bars sold down to 1.8¢ @ 1.85¢; Plates to 2¢ and Skelp to 1.8¢, although in many instances even the lowest figures were shaded in special transactions. At this writing, owing to so many mills being closed, asking prices are firmer at 1.85¢ @ 1.9¢ for Bars; 1.85¢ for Skelp and 2¢ @ 2.1¢ for Plates, but the feeling, for reasons already stated, is nervous and unsettled.

Steel Rails.—The Steel Rail market has been so thoroughly discussed in our New York reports that there is but little to be said at this time. Sales to date for the year are estimated to be about 900,000 tons, which, in round numbers, represents a falling off in sales of about 750,000 tons for the six months, as compared with 1887. Prices average from \$8 to \$9 75 ton lower than they were at this date a year ago, and about \$2 lower than they were six months ago, quotations being \$38 @ \$39 in July, 1887, \$32 in January and \$30 to-day. The outlook for the next six months is not encouraging as regards Rails, although the increasing demand for Steel in other forms is an important offset to the shrinkage in the Rail trade.

Old Rails.—It would be hard to find a period in which so little business was done and with so few changes in prices as during the past six months. They were quoted \$21 @ \$22 for T's six months ago, and are nominally the same to-day, a few unimportant transactions having been made during the period under review at \$20.50 @ \$20.75, most of the sales having been at \$21 @ \$22. The supply is light and the demand equally so, and at the moment there are no indications of change either for higher or lower figures.

Wrought-Iron Pipe.—During the past six months demand has not been up to expectations and prices have been very disappointing. The year 1887 was remarkable for the very large trade in this particular line. Natural gas companies were the largest consumers, and the mills were unable to turn out the stock fast enough, being compelled to work day and night a great part of the time. Prices, too, were held without much difficulty, and in giving an order the buyer was more particular as to time of delivery than to price, generally leaving the mill to arrange the latter. Since the first of the year, however, trade has been quite the reverse of 1887. Demand has gradually fallen off and prices weakened accordingly. Orders received from the natural gas companies are in some cases probably 50 % less than they were a year ago, while several new mills have been erected, adding largely to the productive capacity, and to secure trade these new comers were compelled to cut prices. Add to this the unsatisfactory condition of the Iron trade in general and the natural result is light demand and uncertain prices.

Chattanooga.

Office of *The Iron Age*, Ninth and Carter Sts.,
CHATTANOOGA, TENN., July 2, 1888.

Pig Iron.—The condition of the market remains about the same as last reports and is far from being on a satisfactory basis. Prices are very irregular, and so far as making any quotations are concerned, that is entirely out of the question. Some of the new furnaces are making sales of large lots at outrageously low prices, which must certainly be below cost, and they are making contracts for future deliveries extending far toward the close of the year about on the same basis. On the other hand, most of the old plants are under contract for nearly all of their product. These contracts were made when Iron was much higher than it is now, and, of course, these furnaces are running along quite regardless of the fall in prices. The general opinion seems to prevail that there will be no change for the better until the policy of the general Government on the tariff question becomes more settled, which, of course, cannot be determined during the present year. In addition to this come the anticipated strikes of the workers of Pig Iron and the hot weather of midsummer, during which many of the mills suspend operations, strike or no strike. As yet we do not hear that any of the Southern stacks contemplate blowing out, nor even those that are in course of construction suspending operations, but they are pushing their work forward as fast as possible. There appears to be no doubt, however, but what the present year will develop those that have the longest purses, as well as those that can make Pig Iron the cheapest. Freight remains unchanged since the last deal, \$2.25 to Cincinnati and Louisville and \$3 to St. Louis from this point.

Louisville.

LOUISVILLE, KY., July 2, 1888.

Pig Iron.—There has been no decline in the market since last report. Indications report steady buying at present prices. If it was not expected that several new furnaces would be offering their Iron during July, prices would slightly advance, as the older furnaces are largely sold ahead, and are only offering small lots of off-colored Irons. Buyers continue to make inquiries for deliveries running throughout the year and in some instances for 12 months, and sales have been made on this basis. Among the new furnaces, the DeBardeleben, Pioneer, Sheffield and Nashville are placing their Irons on the market, and their product is spoken of with favor. It is expected that No. 1 of the Sheffield and Birmingham Coal, Iron and Railroad Company's furnaces will be in blast next week, to be followed by No. 2 and No. 3 during the next 60 days. It is thought their Iron will be a most excellent one, as the Ore used is brown, and a portion of their coke will be Pocahontas, whose excellent qualities are well known. Some of the furnacemen think that the continued inquiry on the part of buyers for large quantities of Iron for future delivery indicates that the market will not go much lower, and they are hopeful that the worst has been reached. Advices from the East point to a slight improvement in that direction. Old Material, which is largely used by Rolling mills here, is weak, owing to the threatened shutting down of the works on account of the strike with the employees.

Southern Coke, No. 1 Foundry...	\$16.00 @ \$17.00
" " No. 2 " "	15.00 @ 16.00
" " No. 3 " "	14.50 @ 15.00
Hanging Rock Coke, No. 1 Foundry	16.50 @ 17.00
Hanging Rock Charcoal, No. 1 Foundry	20.25 @ 22.25
Southern Charcoal, No. 1 Foundry	17.25 @ 17.75
Silver Gray, different grades	13.25 @ 14.25

Southern Coke, No. 1 Mill, Neutral	12.75 @ 13.75
" " No. 2 " "	12.25 @ 13.25
" " No. 1 " Cold Short	12.25 @ 13.25
Southern Charcoal, No. 1 Mill	13.25 @ 14.75
White and Mottled, different grades	12.00 @ 12.50
Southern Car-Wheel, standard brands	21.50 @ 24.50
Southern Car-Wheel other brands	18.50 @ 20.50
Hanging Rock, Cold Blast	22.50 @ 24.50
Hanging Rock, Warm Blast	18.50 @ 19.50

Cincinnati.

Office of *The Iron Age*, Fourth and Main Sts.,
CINCINNATI, July 2, 1888.

Pig Iron.—There has been a larger inquiry for Pig Iron during the week under review, and the aggregate sales for June are quite large. The tonnage for the month, as a local firm puts it, with Western dealers, is probably the heaviest of any month this year. Large buyers of Pig Iron apparently realize the weight of the arguments advanced in support of higher prices before many weeks, but the average consumer has exhibited no confidence as yet in a recovery of the market. The demand during the past week for round amounts of Pig Mill Iron for late delivery has demonstrated the fact that Southern furnaces are really sold largely ahead, the would-be buyers being unable to make contracts for large amounts for such deliveries as they desired. It production is increasing in the South so is consumption, and the decline in stocks is good evidence that the market is working into a better condition. There is considerable Mill Iron still available for immediate delivery, but the market is well cleared of foundry grades. It is also very difficult to place orders for Car-Wheel Iron either for present or future delivery. Among the sales effected during the week were 4000 tons No. 1 Mill at \$14.25, for delivery during the entire year; 5000 tons Gray Forge at \$13.25, and between 3000 and 4000 tons mixed grades, Mill and Silvery Iron, at \$13.50 75 ton. Moderate sales of No. 2 Foundry have been made at \$15.50; No. 2 75 do., at \$15; 1000 tons Bessemer at equivalent to \$17.70 75 ton here, and about 500 tons Southern Car-Wheel at \$25 75 ton, cash. Prices current here, cash, f.o.b., are approximately as follows:

Hot-Blast Foundry.

Southern Coke, No. 1	\$16.50 @ \$17.00
Southern Coke, No. 2	15.50 @ 16.00
Southern Coke, No. 3	15.00 @ 15.50
Ohio Soft Stone Coal, No. 1	17.00 @ 17.50
Ohio Soft Stone Coal, No. 2	15.00 @ 15.50
Mahoning and Shenango Valley	16.50 @ 17.00
Hanging Rock Charcoal, No. 1	20.50 @ 22.50
Hanging Rock Charcoal, No. 2	19.00 @ 21.00
Tennessee and Alabama Charcoal, No. 1	17.50 @ 18.00
Tennessee and Alabama Charcoal, No. 2	16.50 @ 17.50

Forge.

Strong Neutral Coke	13.50 @ 14.00
Mottled Neutral Coke	12.50 @ 13.00
No. 1 Mill Coke	13.50 @ 14.00
No. 2 Mill Coke	13.00 @ 13.50

Car-Wheel and Malleable Irons.

Southern Car-Wheel	20.00 @ 23.00
Hanging Rock, Cold Blast	22.00 @ 25.00
Lake Superior Car-Wheel and Malleable	21.00 @ 22.00

Manufactured Iron.—The manufacturers and Iron workers have failed to come to an agreement for the ensuing year, and the result will be idleness at the mills for a longer or shorter time. The Amalgamated Association demands a renewal of last year's scale, while manufacturers propose a reduction. The lull at the mills may help the market for the manufactured product, which is still dull and easy, with prices nominal. Bar and Sheet Iron—Common Bar Iron, 1.90¢ @ 2¢; Charcoal Bar Iron, 2.90¢ @ 3¢; Sheet Iron, Boiled, Nos. 10 to 27, 2.50¢ @ 3.25¢; Sheet Iron, Charcoal, Nos. 15 to 25, 3 1/4¢ @ 4 1/4¢ 75 lb.

Nails.—The demand has been only moderate and an easier tone has prevailed, with lower prices ruling. Quotations are based upon 12d @ 40d, which sell at \$2 75 keg, with 10¢ rebate in carload lots at mills; 50d @ 60d, 25¢; 10d, 10¢; 8d @ 9d,

25¢; 6d @ 7d, 40¢; 4d @ 5d, 60¢; 3d, \$1, and 2d \$1.50 per keg more. Steel Nails sell at \$2, and Steel Wire Nails at \$2.65 @ \$2.75 per keg.

Old Material.—The market has been quiet, but steady under moderate offerings and small sales of Old Wheels at \$19 @ \$19.50. Old Rails are wanted at \$20, cash, here.

New York.

Office of *The Iron Age*, 66 and 68 Duane St., New York, July 3, 1888.

American Pig.—Very little business has been done during the past week, and no movement of any consequence is expected in the near future. During the week another striking case has come up illustrating the injury which some sellers of Southern Iron are doing to themselves and principals. A leading foundry up the Hudson River contracted for the delivery of a 1000-ton lot of Southern Foundry Iron some months past. They finally received 250 tons and were unable to get the balance, so that they were finally forced to go into the open market to cover their requirements. The Southern furnaces seem to be willing to book any amount of orders "subject to furnace maker," knowing that they cannot by any possibility fill them all. Such methods are trying to all parties concerned, and are injurious to the best interests of merchants and manufacturers. They should make arrangements to provide against delays in the delivery of Iron. Even now the cotton season is approaching and it looks as though the experience of past years of having large quantities of Iron wanted by consumers lying quietly for months at Savannah will be repeated. We quote for standard and choice Northern Irons, tidewater delivery, \$17.50 @ \$18.50 for No. 1 Foundry, \$16.50 @ \$17.50 for No. 2 Foundry and \$15 @ \$16 for Gray Forge. The strike in the Western mills has little effect upon this market, which is insignificant so far as Mill Pig is concerned.

Scotch Pig.—We quote: Coltness, \$19.50 @ \$20; Summerlee, \$19.50 @ \$19.75; Langloan, \$19 @ \$19.50, and Dalmellington, \$18 @ \$18.25.

Spiegeleisen.—The market is very dull, with reports of offers to sell German Spiegel at \$26 on cars Jersey City, while English is held at \$27 @ \$27.25.

Bar Iron.—As yet no serious effect upon prices has been caused by the lock-out in the Western mills, though their withdrawal from Eastern markets, which they have helped to demoralize, is likely to cause a better feeling. It is believed, however, that the closing down will not extend beyond July. We quote carload lots, on dock, half extras, Common Iron, 1.6¢ @ 1.65¢; Medium, 1.65¢ @ 1.7¢, and Refined, 1.75¢ @ 1.8¢.

Structural Iron.—We quote: Bridge Plates, 1.95¢ @ 2¢; Angles, 2¢ @ 2.2¢; Tees, 2.5¢ @ 2.7¢; Channels and Beams, 3.3¢, on dock.

Plates.—We quote: Tank, 1.9¢ @ 2¢; Shell, 2.15¢ @ 2.30¢; Steel Tank, 2.4¢ @ 2.15¢; Shell, 2.15¢ @ 2.25¢; Flange, 2.6¢ @ 2.75¢, and Fire-Box, 3¢ @ 3.25¢.

Steel Rails.—In the East the market is very quiet, and business has been confined to small lots, and inquiries are confined to a few round lots, up to 5000 to 10,000, for early fall delivery. With Rails selling at \$31 at Chicago, which is equivalent to \$27.75 at Eastern mills, the latter are practically confined to the East and South. In the West more business is reported, one mill having closed 23,000 tons in 70 days, while another is reported as having taken one large contract. Even there, however, little business is in sight. We quote nominally \$30 for moderate lots at Eastern mills.

Wire Rods.—Only a few small sales have been made at \$40 @ \$40.50, which we quote.

Old Rails.—No business of any consequence is reported, and we continue to quote \$20 @ \$20.50 nominally for T's.

Fastenings.—Spikes are \$2 @ \$2.05, and Angle Bars, 1.85¢ @ \$1.9¢ delivered.

Financial.

Business everywhere is quiet but hopeful. A central point of interest just now, that which affords the most reason for apprehension, is the outcome of labor questions among the iron-workers of Pennsylvania and the West. In another quarter much interest is excited by the action of Judge Brewer in granting an order temporarily restraining the promulgation of the reduced railroad tariff in Iowa pending argument for an injunction. The cutting of rates on the trunk lines causes general demoralization east of Chicago.

The Stock Exchange markets remain as for some weeks past, dull and uninteresting, aside from the severe cutting of rates between rival lines of transportation and the prospect of a legal contest in the United States Court to determine the powers of State Railroad Commissioners in fixing tariffs. As has been truly remarked, the situation is peculiar, inasmuch as under the Interstate law the companies cannot form a pool, and differentials having failed, there is no known remedy for the difficulty.

Government bonds are quoted as follows:

U. S. 4½s, 1891, Registered.....	107¼ @ 107¼
U. S. 4½s, 1891, coupon.....	107¼ @ 107¼
U. S. 4s, 1907, registered.....	127¼ @ 127¼
U. S. 4s, 1907, coupon.....	127¼ @ 127¼
U. S. Currency 6s, 1895.....	119 @ 119

A sample of new crop amber wheat from Ohio was shown on the Produce Exchange on Saturday by J. J. Blackman & Co. The quality of the wheat was exceptionally fine, and would weigh 61 to 62 lb to the bushel. The weather during the past week has been favorable for all growing crops in the wheat, corn and tobacco regions of Ohio, the Upper Mississippi and Missouri valleys and Tennessee. The State Board of Agriculture of Illinois state that there has been a decided improvement in the condition of the crops of that State. The condition of winter wheat in the central counties gives encouragement for about an average yield. Winter-wheat harvest is well advanced in the southern counties. The prospect of the corn crop is better.

The official crop report of Colorado shows that alfalfa is the leading crop, being represented by 250,000 acres, while corn has an acreage of 225,000 and oats of 200,000. A dispatch received in this city from London reports India wheat seriously damaged by drought. Speaking of the wheat harvest now in progress the San Francisco papers remark: "The result up to the present has been an agreeable disappointment to those who looked for very short crops."

The weekly bank statement shows comparatively slight changes in specie and legal tenders. The combined loss of these, which constitute the total reserve, is only \$304,700, but the surplus reserve is down, due to an expansion of \$3,278,300 in loans, which is the only striking feature of the exhibit. The banks have increased their loans within a month over \$13,500,000, probably due to preparations to meet July obligations. The banks now hold \$26,817,225 in excess of the 25 % legal requirements, against \$3,651,075 last year and \$11,021,450 in 1886. The Treasury payments for interest and bonds purchased will further augment the bank reserves in the near future. The effect of the preparations incident to the July dis-

bursements has been so slight as to be almost imperceptible. Call loans are still quoted at 1 % @ 2 %, and time loans at 2 % @ 3 ½ %, according to the period for which they run and the kind of collateral offered. A feature of the market was the placing of some \$5,000,000 Canadian funds for six months at 3 % and under. This sum was a part of the proceeds of the loan recently negotiated abroad by the Dominion of Canada, but in excess of immediate requirements. Prime mercantile paper passed as low as 3 ½ %, but the running rates were 4 % @ 5 %. The exports of specie during the week were unimportant, scarcely exceeding \$200,000.

The weekly statement of bond purchases is as follows: Amount purchased of 4 per cents, \$18,383,800; amount purchased of 4 ½ per cents, \$8,393,050; total, \$26,776,850; cost of 4 per cents, \$23,347,744.20; cost of 4 ½ per cents, \$9,089,056.20; total, \$32,386,800.40; cost at maturity, 4 per cents, \$32,539,326; cost at maturity, 4 ½ per cents, \$9,705,158.31; total, \$42,244,584.31; saving on 4 per cents, \$9,191,581.80; saving on 4 ½ per cents, \$666,102.11; total, \$9,857,683.91. The Commissioner of Internal Revenue estimates the total receipts from internal taxes during the fiscal year just closed to be \$124,500,000. This is an increase of nearly six millions over the receipts of last year and an increase of \$4,500,000 over the Commissioner's estimate at the beginning of the year. The receipts from Customs will probably not exceed greatly the receipts of last year. For the entire fiscal year ended June 30, 1887, they were \$217,286,898. The estimated reduction in the public debt for the month of June is \$14,429,502, and for the year \$113,900,000, against \$109,707,646 for the fiscal year ended June 30, 1887.

The imports of merchandise at this port during the week were valued at \$9,000,000, of which \$2,000,000 represents dry goods. Since January 1 the total is \$240,157,000, as compared with \$236,015,000 during the same time last year. The exports were \$4,726,647.

There were 182 more mercantile failures in the United States during the last six months than there were during the first half of last year, and the increase in the liabilities of those who failed in the first quarter of the present year was about \$5,000,000. *Bradstreet's*, which supplies these figures, attributes the increase mainly to cotton speculation, a bank failure and "dry rot" in several old business houses. For the second quarter the increase of liabilities is about \$6,000,000, attributed largely to the failure of the American Exchange in Europe, of a large dry goods house, a whisky house and a tea firm. Assets, however, amounted to 53 % of liabilities, as against 48 % one year ago.

The assessed valuation of real estate in New York City for 1888 is \$1,302,818,879; increase over last year, \$48,327,080, equal to 3.85 %.

There was a decrease yesterday of 5¢ in the East-bound rate on agricultural implements from Chicago.

The foreign exchange market is again firmer, and on Monday the rate was advanced ½ to \$4.87 ½ @ \$4.89.

In coffee and cotton there has been unusual speculative interest, Rio advancing in a single day 9¢ per pound, the widest fluctuation known in the history of the Exchange, and dealings in cotton were larger than for a long time past, though at a lower range, cash cotton declining ¼¢ @ ½ lb. Raw sugars were strong, with an active demand from refineries. No small degree of interest attaches to the decision of the Attorney-General of this State to inquire judicially into the combination commonly known as the Sugar Trust, and it is surmised that proceedings will commence without delay. Nothing further

has transpired concerning the threatened boycott of non-union refineries in Philadelphia. In wheat there is a firmer feeling, in consequence of a better export demand. Corn and oats advanced slightly in sympathy with wheat. Provisions are dull and easy. The dullness long observed in manufactures of wool begins to be felt in cotton goods. For most descriptions of staple groceries quotations are firm. Prices of anthracite coal are well maintained under a restricted production.

The city of Providence, R. I., has established a bank clearing house. There are 34 banks that have associated themselves with the new organization and two trust companies.

Metal Market.

Copper.—Chili Bars opened in London on Thursday of last week at £81. 2/6, spot, and improved 2/6, but the advance was lost subsequently, and they again came £81. 5/ yesterday, while futures maintained the 5/ gained, coming £78. 10/ yesterday. The total sales did not exceed 225 tons. In our own market Copper was devoid of anything doing to speak of, spot and July ranging between 16½¢ and 16.60¢, nominally; August at 16.45¢, September and October at 16.40¢ @ 16.45¢, down to 15.90¢ bid. In the London market spot Chili Bars remain steady to-day at £81. 5/, while futures have given way 10/, being cabled £78. Our own market is absolutely stagnant to-day at nominally 16.50¢ @ 16.60¢ spot Lake. It was cabled from London since our last report that the French syndicate has made a contract with two of the leading Copper mines in Japan, representing seven-eighths of the total output of that country, for their product during three years. On the Paris Stock Exchange Rio Tinto shares declined last week 8½ francs.

Tin.—Spot Tin opened last Thursday in London at £75. 2/6, and futures at £75. 10/, but the former the next day improved to £75. 5/, the latter remaining steady, sales amounting to 160 tons, while here the dull state of affairs continued, spot being offered at 17.05¢, while 16.80¢ was bid, June at 17½¢, with 16½¢ bid; July and August at 17.05¢, with 16.95¢ bid, and 70 tons, August, sold at the latter figure, after 45 tons had been done at 16.85¢ on Thursday. This week opened in London under more favorable auspices, 220 tons being sold yesterday, and the quotation for spot coming 7/6 higher, at £75. 12/6, while futures improved 15/, to £76. 5/. The improvement on the other side was responded to in our own market by an advance, 145 tons being sold at 17.25¢ @ 17.55¢ for August, 17.25¢ for July, and 17.45¢ @ 17.50¢ for October. London this morning opens at a further improvement of 5/, futures as well as spot, the latter being worth £75. 17/6 and the former £76. 10/. The cause of the buoyancy has to be searched for in the favorable statistics disclosed by the figuring up on the 1st inst. The deliveries in London and Holland reached last month no less than 4268 tons, against 1999 in June, 1887, and 1835 in June, 1886, reducing the visible supply in Europe and America, July 1, to 20,403 tons, as compared with 16,092 tons same time last year, and 10,871 on July 1, 1886. **Tin Plates.**—Stocks continue light, which helps to sustain the price for spot lots. Considerable concessions can be had for future delivery. The demand is only moderate for the latter, as well as for spot Plates. We quote at the close, large lines, on the spot: Siemens-Martin Steel, Charcoal finish, \$5 @ \$5.25; ditto Coke finish, \$4.80; Ternese, \$4.30 @ \$4.40; Bessemer Cokes, \$4.50 @ \$4.60, and Wasters, \$4.35 @ \$4.40. Coke Tins are selling at 12/9 in Liverpool, for prompt delivery.

Lead.—Consumers took during the week under review 300 tons of Common Domestic Lead in the open market at 3.80¢ @ 3.85¢, but the price to-day is 3.90¢. They all complain of a dull trade and serious falling off in the demand. Meanwhile London has been improving, and Soft Spanish is cabled £12. 10/, which is a 2/6 advance since our last. But even at this advance it can be laid down in New York in bond at 2½¢. Lead sales at the Metal Exchange embraced on Thursday last 178 tons at 3.80¢ @ 3.82½¢, spot, 3.87½¢ @ 3.95¢, July and 4.05¢, August; on Friday 400 tons at 3.95¢ @ 3.97½¢, July, 4¢ @ 4.05¢, August, and 4.05¢ September; yesterday 500 tons brought 4¢ @ 4.02½¢ on the spot, 3.95¢ @ 3.97½¢ for July, 3.90¢ @ 3.95¢ for August, and 4.02½¢ @ 4.05¢ for September.

Spelter and Zinc.—Common Domestic Spelter does not bring over 4½¢, ordinary brands, just at present, the demand for the week having been insignificant, while Silesian may be quoted 5¢ @ 5½¢. The course of the market here would improve if the lockout in the Iron regions were avoided, as a good demand for Galvanizing might then possibly set in. While this question remains in abeyance not much of a revival need be looked for. In Europe a further improvement in Lead might start an upward movement in Spelter again, as the two metals usually go together on the Continent.

Antimony.—Nothing of interest has occurred. The demand is moderate, but steady, at 13½¢ @ 13½¢ Cookson, and 10½¢ @ 10½¢ Hallett.

New York Metal Exchange.

The following sales are reported:

THURSDAY, June 28.	
16 tons Lead, spot	3.80¢
16 tons Lead, spot	3.82½¢
16 tons Lead, July	3.87½¢
16 tons Lead, July	3.92½¢
16 tons Lead, July	3.95¢
46 tons Tin, August	16.85¢
50 tons Lead, August	4.15¢
48 tons Lead, July	3.92½¢
16 tons Lead, July	3.92½¢
FRIDAY, June 29.	
25,000 lb Copper, October	16.40¢
96 tons Lead, July	3.87½¢
50 tons Lead, August	4.05¢
16 tons Lead, July	3.97½¢
16 tons Lead, July	3.95¢
16 tons Lead, August	4.02½¢
16 tons Lead, August	4.00¢
16 tons Lead, August	4.02½¢
100 tons Lead, August	4.02½¢
34 tons Lead, August	4.00¢
50 tons Lead, September	4.05¢
100 tons Lead, August	4.00¢
MONDAY, July 2.	
10 tons Tin, August	17.35¢
10 tons Tin, August	17.30¢
50 tons Tin, October	17.50¢
10 tons Tin, October	17.45¢
250 tons Lead, August	3.95¢
16 tons Lead, August	3.92½¢
16 tons Lead, August	3.90¢
(Sellers right to double.)	
16 tons Lead, August	3.90¢
(Sellers right to double.)	
16 tons Lead, September	4.05¢
100 tons Lead, September	4.02½¢
88 tons Lead, September	4.00¢
10 tons Tin, August	17.80¢
30 tons Tin, July	17.25¢
16 tons Lead, spot	4.00¢
16 tons Lead, spot	4.02½¢
16 tons Lead, July	3.97½¢
16 tons Lead, July	3.95¢
16 tons Lead, July	3.97½¢
25 tons Tin, August	17.35¢
TUESDAY, July 3	
82,500 lb Lead, September: (sellers' right to double)	4.07½¢

Coal Market.

The Anthracite Coal trade is reported to be in excellent condition, free from labor troubles, and with prices well maintained. The Coal sent to market during the year, to date, is 15,695,759 tons, against 15,238,579 tons for the same period last year. Quotations are as follows: Wyoming Free Burning, f.o.b. at South Amboy and Weehawken, Broken or Grate, \$3.75; Egg, \$4; Stove and Chestnut, \$4.25; Reading

Hard White Ash, at Port Elizabeth, Lump and Steamboat, \$4.25; Broken, \$4; Egg, \$4.10; Stove, \$4.25; Chestnut, \$4.15; Pea, \$3. Free burning White Ash is the same, except Broken, \$3.75, and Egg, \$4. Lehigh Coals are: For Lump, \$4.50 Broken, \$4.20; Egg, Stove and Chestnut, \$4.10 ½ ton, f.o.b. at the loading ports.

A tacit understanding exists all round that about July 15 prices of Anthracite will be advanced 15¢ @ 25¢ ½ ton, or an average of about 20¢. In the absence of any formal announcement to this effect the proposed advance is referred to as bearing the stamp of authority.

The Bituminous trade is dull and sales are heard of as low as \$2.90 alongside. Comparatively little is doing excepting in deliveries on old agreements.

Imports.

The imports of Iron and Steel, Hardware, &c., at this port from June 18 to June 28, inclusive, and from January 1 to June 28, inclusive, were as follows:

Iron and Steel.

	June 18 to June 28.	Jan. 1 to June 28.
Tons.	Tons.	Tons.
Iron Ore: R. D. Flores	988	5,205
Pig Iron: Naylor & Co.	480	3,190
Crocker Bros.	400	5,480
G. W. Stetson & Co.	300	10,700
N. S. Bartlett	200	3,000
Jas. Williamson & Co.	200	2,500
A. Milne & Co.	105	859
Henderson Bros.	100	1,175
Jas. Lee & Co.	25	325
Spiegelglas: Naylor & Co.	1,069	4,379
Crocker Bros.	65	1,566
Steel: W. F. Wagner	53	759
J. Abbott & Co.	21	250
R. H. Wolff & Co.	16	260
Pierson & Co.	12	26
N. Cohn & Co.	13	142
A. Milne & Co.	11	947
C. Huggill	9	150½
F. S. Pilditch	7	245
Montgomery & Co.	7	48
Thos. Prosser & Son	7	16
C. W. Power	7	41
H. W. Belcher	5	5
C. F. Baker	4	111½
J. G. Wilson	3	7
R. F. Downing & Co.	1½	167½
Steel Rods: Naylor & Co.	1,517	11,000
R. H. Wolff & Co.	810	2,810
J. A. Roebling's Sons	214	1,155
J. Abbott & Co.	145	3,509
R. F. Downing & Co.	51	156
Dana & Co.	26	531
Cary & Moen	23	527
Montgomery & Co.	12	60
Iron: J. Abbott & Co.	180½	1,845½
G. Lundberg	150	150
R. F. Downing & Co.	5	5
Steel Sheets: R. Crooks & Co.	11	225
Steel Bullets: Naylor & Co.	519	2,264
J. Abbott & Co.	167	1,117
J. A. Roebling's Sons	126	870
A. Milne & Co.	50	359
Steel Plates: Naylor & Co.	50	167
Hondollette & Co.	20	89
H. Crooks & Co.	5	670
Steel Hoops: A. R. Whitney & Co.	100	1,705
Steel Bars: R. H. Wolff & Co.	15	19
Naylor & Co.	10	871
C. S. Mersick & C.	5	191
Steel Forgings: Thos. Prosser & Son	170	2,579
Steel Crop Ends: Naylor & Co.	790	1,080
Steel Wire: J. A. Roebling's Sons	38	115
Steel Tubes: J. B. Leng's Sons	11	35
Steel Rails: St. Paul, M. & C. R. Co.	598	598
Scrap Steel: A. Milne & Co.	7	57
Rivet Rods: J. Abbott & Co.	397	1,904
J. A. Roebling's Sons	258	417
Iron Rods: J. Abbott & Co.	15	192
Sheet Iron: T. B. Coddington & Co.	60	743
Nail Rods: J. Abbott & Co.	169	274
Channel Bars: J. G. Wilson	98	98
Wells, Fargo & Co.	6	6
Iron Girders: Peter Wright & Sons	24	24
Iron Beams: R. F. Downing & Co.	45	165
W. H. Wallace & Co.	41	211
Cotton Ties: Naylor & Co.	1,400	1,400
Swede Iron: A. Milne & Co.	253	253
Old Rails: Perry & Ryer	100	100

Tin Plates.

	Boxes.	Boxes.
Phelps, Dodge & Co.	16,481	289,288
Dickerson, Van Dusen & Co.	7,941	135,747
T. B. Coddington & Co.	5,723	70,048
Hy. Whittemore & Co.	4,000	37,895
Pratt Mfg. Company	3,703	82,459
Wolff & Roesing	2,667	17,274
N. L. Cort & Co.	1,617	57,968
A. A. Thomsen & Co.	1,300	54,465
Lombard, Ayres & Co.	1,000	4,744
R. Crooks & Co.	917	86,903
H. B. DeMitt & Co.	853	7,128

Merchant & Co.	848	6,176
Bruce & Cook	1,444	46,929
Central Stamping Company	478	18,150
Iron Clad Mfg. Company	88	119

Taggers Tin: Phelps, Dodge & Co.	258	575
Hy. Whittemore & Co.	250	500

	Pounds.	Pounds.
Tin: Muller, Schall & Co.	1,766,123	4,800,537
Naylor & Co.	202,131	1,117,244
Hendricks Bros.	28,884	264,464
Knauth, W. & Kuhne.	22,400	23,400
F. Nauman	8,000	8,000
Spelter: Thos. J. Pope's Sons & Co.	56,000	56,000
American Metal Company	22,898	410,179
Old Brass: Lawrence, Johnston & Co.	9,221	17,693
Sheet Zinc: A. Milne & Co.	2,305	2,305
Lead: N. Corwith & Co.	222,842	222,842
E. A. Caswell.	91,574	91,574
Antimony: Edward Hill's Son & Co.	200	975
American Metal Company	25	95

Hardware, Machinery, &c.

Baker, Hermann & Co., Mdse., cs., 11	
Baldwin & Co., Mach'y., case, 1	
Barbour Bros. & Co., Mach'y., pkgs., 36	
Brown, Geo. W., Mach'y., box 1	
Cotter & Company, mach'y., pkgs., 19	
Erie Dispatch Company, Mach'y., pkgs., 8	
Field, Alfred & Co., Anvils, 135	
Goodwin, R. J. & Son, Wire Plate, cks, 5	
Graef Cutlery Company, Cutlery, cs., 6	
Hartley & Graham, Mdse., cs., 11	
Hurst, F. W. J., Mach'y., pkgs., 4	
Jimines, Hausstedt & Co., Mach'y., pcs., 2	
Lafferty, R. B., Mach'y., pkgs., 8	
Mecham Arms Company, Mdse., cs., 8	
Merchants' Dispatch Company, Chains, cks., 28	
Rott, C., Mach'y., crates, 8	
Schoverling, A., Mdse., cs., 22	
Schoverling, Daly & Gales, Mdse., cs., 25	
Scoville Mfg. Company, Mdse., cs., 14	
Ward, Asline, Mdse., cs., 8	
Wiebusch & Hilger, Chains, cks., 26; Mdse., cs., 2	
Witte, John G. & Bro., Cutlery, cs., 14	
Order: Machinery, cs., 2	

Irons and Metals Warehoused from June 18 to June 28, Inclusive.

		Pounds.
Spelter:	Lewisohn Bros.....	44,092
Exports of Metals.		
	June 18 to June 28. Pounds.	Jan. 1 to June 28. Pounds.
Copper:	J. Abbott & Co.....	771,621
	Lewisohn Bros.....	5,384,795
	F. A. Lomal.....	3,879,022
	American Metal Co.....	2,581,298
	G. H. Nichols.....	4,342,453
	J. Bruce Ismay.....	228,939
	S. Mendel.....	112,000
	Ledoux & Co.....	560,000
	Phelps, Dodge & Co.....	110,376
	Muller, Schall & Co.....	280,664
	Copper Queen Con. M. Co.....	490,000
	J. Kennedy, Tod & Co.....	224,034
	H. Becker & Co.....	112,026
	Orford C. & S. Rfg. Co.....	1,250
	Robt. M. Thompson.....	224,881
	Thos. J. Pope, Sons & Co.....	125,000
	J. Parsons & Co.....	765,880
	Bridgeport Copper Co.....	67,500
	C. Herold.....	112,000
	Phelps Bros.....	250,000
	R. W. Jones.....	6,250
	Copper Matte: Williams & Terhune.....	180,984
	887,489	28,621,256
	Lewisohn Bros.....	3,021,610
	American Metal Company.....	227,408
	J. Abbott & Co.....	1,272,563
	C. Ledoux & Co.....	295,000
	F. W. J. Hurst.....	458,800
	G. H. Nichols.....	184,288
	H. T. Nichols & Co.....	722,777
	Old Brass: Burgass & Co.....	180,996
	Old Copper: Burgass & Co.....	14,812
	67,721	212,098
		461,953

Old Metals, Rags, &c.

The purchasing prices offered by dealers are as follows:

Heavy Copper	£ 50.10 @ \$0.07
Light Copper	£ .07
Copper Bottoms	£ .07
Brass, Heavy	£ .05
Brass, Light	£ .05
Composition	£ .10
Lead, Heavy	£ .08 1/4
Tin Lead	£ 8.00
Zinc	£ .08 1/4
Wrought Iron	£ 16.00 @
Light Iron	£ 8.50 @
Stove Plate Iron	£ 9.50 @
Machinery Iron	£ 18.00 @
Grate Bars	£ 5.00 @
Old Rubber Springs	£ .04 1/4 @
Old Rubber Shoes	£ .01 1/4 @
White No. 1	£ .03 1/4 @
White No. 2	£ .04 @
Canvas, Linen, No. 1	£ .04 1/4 @
Canvas, Cotton, No. 1	£ .04 1/4 @
Canvas, No. 2	£ .03 1/4 @
Seconds	£ .01 @
Soft Woollens	£ .06 1/4 @
Mixed Rags	£ .01 @
Gunny Bagging, No. 1	£ .02 @
Jute Butts	£ .02 @
Book Stock	£ .01 1/4 @
Newspapers	£ .00 1/2 @
Waste Paper	£ .00 1/4 @
Hemp Twine	£ .08 @
Sisal Baling Rope	£ .06 1/4 @

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, TUESDAY, July 3, 1888.

There is still a more or less unsettled feeling in the markets for Block Tin and Copper. The syndicate doings are carefully hidden and outside speculative holders do not appear to be very enthusiastic. It is the belief that a large portion of the syndicate Tin is still unsold and the impression obtains that that interest would be the first to meet any improvement in the demand. However, the fact that the Chinese dealers in the Straits have stored metal in considerable quantities at primary points instead of selling at late current prices leads to a belief that support may be looked for in that quarter. Trading has been more active the past two days and purchases for cornering of "short" sales gave prices a turn for the better. There is a large quantity of high-priced Copper held in this market by outside speculators, and, in view of the fact that no opportunity has been afforded for satisfactory reselling, it is thought that forced realizations will soon be in order. The business in Refined Copper, Sheets, &c., is still very much restricted, and an undercurrent of weakness is apparent that contrasts with the seeming firmness of Chili Bars. The Associated Smelters have lowered their price for Best Selected to £78, but outside lots are £1. 6/ @ £2 below that and difficult to sell. Sheets have also been reduced, and the nominal prices are now £6 below those current last month. There is some uncertainty as to whether the reductions made were wholly on the manufacturers' own responsibility or agreed to by the syndicate. In either event revision has no favorable bearing upon the market for Chili Bars. The visible supply in Europe is stated at 72,000 tons, against 52,000 tons a year ago, but the amount of Copper "in sight" does not cover the entire stock. The syndicate hold no less than 65,000 tons foreign, besides about 20,000 tons English. It is stated that a considerable quantity of outside Copper and Furnace Material has been purchased recently for syndicate account, and that interest is thought to have more complete control now than heretofore. Regarding contracts made by the syndicate for Japanese Copper, reference to which was made in a previous report, the following particulars are given: The contracts call for 9000 tons out of the annual production of about 10,500 tons, and run one year, with the option of being renewed, for similar quantity, for a series of years ahead.

The Tin Plate Market has undergone very little change, and that little is certainly not for the better. As a matter of fact the demand has dropped off considerably, while some makers have named very low prices as a means of drawing in orders for future delivery. This weakness is partially due to increased production, as well as moderate demand. Richard Thomas, London, has purchased the Melin-Griffiths plate works for £12,000.

The Clyde shipbuilders have secured large contracts recently, and this together with a good demand for railway supplies has caused quite a brisk demand for Steel of nearly all descriptions. The sale is reported of a cargo of Blooms for shipment to Boston from the Tees, the first American transaction in a long time. The Ebbw Vale Company have secured an order for 11,000 tons Steel Rails for a Portuguese railway. The price is not stated. Their Staffordshire ironworks are being put in readiness for restarting.

Beyond some hardening of prices of Hematite, due probably to the renewed activity in the Steel trade, there has been no material change in the Pig Iron mar-

kets. Middlesboro' Pig barely holds its own, and Scotch staggers under the weight of heavy surplus stocks, the amount in Connal's stores being now 1,000,000 tons. There has been a little "spurt" in warrants, due to covering by speculators.

A meeting of the creditors of Stevenson Jaques, Middlesboro', has been held, at which a report was submitted showing liability £42,000, and assets £13,000.

There has been a "strike" at the West Cumberland Steel Works, and the workmen are all out.

Scotch Pig.—A fair volume of business and prices steady for most brands.

No.	Coitness, f.o.b.	Glasgow.	
No. 1 Summerlee	"	"	46/6
No. 1 Gartsherrie	"	"	44/6
No. 1 Langloan	"	"	44/8
No. 1 Carnbroe	"	"	39/
No. 1 Shotts	"	at Leith	45/
No. 1 Glasgow	"	Ardrossan	43/
No. 1 Dalmeilington	"	"	39/6
No. 1 Eglinton	"	"	38/

Steamer freights, Glasgow to New York, 5/; Liverpool to New York, 7/6.

Cleveland Pig.—Prices firmly held, but business moderate. No. 1 Middlesboro', G.M.B., 34/; No. 3 do., 31/8.

Bessemer Pig.—The market very steady, with a good business passing. West Coast brands, mixed numbers, 42/8, f.o.b. shipping point.

Spiegeleisen.—Demand continues good, and prices are very firm. English 20 % quoted 80/, f.o.b. N. W. England shipping point.

Steel Rails.—The market steady, and demand fairly active. Standard sections quoted at £3. 17/, f.o.b. at N. W. England shipping point. Middlesboro' district about 2/6 @ 5/ less.

Steel Blooms.—Rather quieter, but steady. We quote at £3. 13/8 for 7 x 7, f.o.b. at N. W. England shipping point.

Steel Billets.—A good business at slightly lower prices. Bessemer, 2 1/2 x 2 1/2 inch, £3. 17/6, f.o.b. at N. W. England shipping point.

Steel Slabs.—Demand moderate. Prices barely steady. Bessemer, £3. 18/6, f.o.b. at N. W. England shipping point.

Steel Wire Rods.—Quiet market and prices easier. Mild Steel No. 6 quoted at £5. 16/3 and No. 5 at £5. 12/8, f.o.b. at N. W. England shipping point.

Old Rails.—Demand still light and prices weaker. Tees quoted at £2. 15/ @ £2. 17/6, and Double Heads £2. 17/6 @ £3, c.i.f., New York.

Scrap Iron.—Market dull and rather weak. Heavy Wrought at £2. 5/ @ £2. 7/6, f.o.b.

Crop Ends.—Demand slow and prices nominal. Bessemer quoted £2. 5/ @ £2. 7/6, f.o.b.

Tin Plate.—Only a moderate trade and prices barely steady. We quote, f.o.b. Liverpool:

IC Charcoal, Allaway grade	14/9 @ 15/
IC Bessemer steel, Coke finish	12/9 @ 13/
IC Siemens	13/8 @ 13/6
IC Coke, B. V. grade	12/9 @ 13/
Charcoal, Terne, Dean grade	12/6 @ 12/9

Manufactured Iron.—A firmer tone to the market, but business not brisk. We quote, f.o.b. Liverpool:

Staff. Ord. Marked Bars	£ 4 17/6 @ 5 0/0
Common	£ 4 17/6 @ 5 0/0
Bl's Sheet, singles	£ 6 10/0 @ 6 10/0
Welsh Bars (f.o.b. Wales)	£ 4 12/6 @ 4 15/0

Tin.—Irregular market, more active trading. Straits quoted at £76 @ £78. 5/ spot, and £76. 5/ @ £78. 10/ for three months' futures.

Copper.—Trading moderate; market barely steady. Chili Bars closed at £81. 2/6 @ £81. 5/, spot, and £78, three months' futures. Best Selected, £79, nominal.

Lead.—More doing and the market firmer. Soft Spanish, £12. 7/6 @ £12. 10/ at the close.

Spelter.—Quiet market and prices still in buyers' favor. Silesian, ordinary, £14. 15/ @ £15 at the close.

Hardware.

The month opens with a moderate demand, and a market in which prices are, as a rule, unchanged. Some quotations are, however, being revised, and lower prices in special lines are ruling, but the prices of goods generally continue as before.

Nails.

The New York market continues very quiet, as is natural during the present season. A number of mills throughout Eastern Pennsylvania have closed down during the hot weather. We quote carload lots on dock \$1.90 to \$1.95, and smaller lots from store \$1.95 to \$2.

R. H. Johnson, who is connected as secretary with the Wire Nail, Wire, Iron Rope and Bessemer Steel Association, has issued a circular containing proposals looking toward putting the Cut-Nail trade on a sounder basis. His plan is to allot percentages to the mills monthly, on the basis of estimated consumption, the mills not knowing until the end of the month what their allotment has been, the whole quantity being based upon the number of machines. If a mill exceeds its allotment it pays a fixed sum into the treasury, from which those draw allowances who have not made as much as their allotment. It is stated that all of the Wheeling mills have signed and that all but two of the leading works west of the Allegheny Mountains have agreed to the scheme. A commissioner located at Chicago is to take charge of the allotment of production, the mills managing their own affairs in other respects. Mr. Johnson has already made approaches to some of the leading Eastern interests. Whether or not the scheme can be carried through remains to be seen. Past efforts in this direction have been anything but encouraging.

Wire Nails.

The market is without material change, prices being irregular and low, \$2.50 being named as the carload price at factory, and small lots from store selling at \$2.60 to \$2.70.

With reference to the condition of the Wire Nail market we have the following from a well-known manufacturer:

It is perhaps too old a story to say to you that Wire Nails are selling very much less than cost, and we yet find an unfeeling public slow to believe that this is true. The fact, however, remains that prices are such that they must be speedily disastrous to a large amount of capital and to a great many people who have ventured into this industry. In spite of this state of things, however, your paper often gives glowing accounts of a new concern started in some community where people have not yet had their fingers burned. Confiding stockholders are going to learn something in the next two or three years.

Barb Wire.

The market is sluggish with a small demand. Prices are to a large extent nominal, being quoted at 4 cents for carload lots and 4.30 cents for small lots from store. It is probable that these prices could be slightly shaded.

Ammunition.

The Ammunition market to a casual observer continues in about the condition it has been for several weeks, there being no obvious change in the situation. The offering of Cartridges by the E. C. Meacham Arms Company, at cut prices still continues, and they are unquestionably supplying a good many goods, and to a considerable extent annoying their competitors and the manufacturers, and thus demoralizing the market. Most of their sales are to the small trade at but a slight concession from regular prices, their policy apparently being to sell Ammunition in St. Louis at New

York prices, a thing which, by the rules of the association, their competitors, who are loyal to the association, are not permitted to do. At the same time the Meacham Company are making some sales at lower prices to the larger trade, but a desire to keep their stock from becoming exhausted makes them exceedingly cautious in so disposing of their goods, especially in view of the policy of the association, to which we have before referred, of having the goods purchased in their interest for the purpose of exhausting the supply.

While the Meacham Company are thus shrewdly and persistently carrying on their part in the contest it must be borne in mind that the association are doing all that they can to keep the market regular, and to prevent the Meacham Company from obtaining goods. As there is reason to believe that the company's stock is being replenished from time to time, the association are using due diligence to ascertain the sources of supply, and to prevent the furnishing of the goods. With a view to accomplishing this they have been adopting measures to induce the Special and the A houses to adhere closely to the letter and spirit of their contracts, so as to prevent irregularities as far as possible. The requirement of a monthly affidavit exceedingly sweeping in its scope went into effect last January, but, not satisfied with this, it is reported that efforts have been made in some cases to obtain additional affidavits. This policy has not, however, in all cases resulted as desired, having been met by a refusal to give other affidavits than those called for in the terms of the contract. It is also generally understood that special pains have been taken to get information in regard to the sales made by houses between whom and the Meacham Company it was thought that there might have been some kind of an understanding, and it is intimated, apparently on good ground, that "spotters" or detectives have been employed with more or less freedom to ascertain the source or destination of goods.

The result of this action has probably been to a certain degree successful, as the association have made it somewhat more difficult than it has heretofore been for the trade to purchase Ammunition at irregular prices. For some time, as our readers are aware, there had been in a very quiet and confidential way a great deal of irregularity in the prices at which Cartridges have been sold, many of the trade who purchased in considerable quantities being able to get in an indirect way concessions from the regular price. To such an extent has this irregularity been carried that it has been estimated by a well-informed party in this line that a comparatively insignificant portion of the Cartridges consumed were free from irregularity in price somewhere between the factory and the counter. While it is probable that the manufacturers have succeeded in slightly checking this tendency, our advice are to the effect that the irregularity continues without substantial abatement, and that buyers can still in many cases obtain concessions, as the association are apparently finding much difficulty in regaining or holding their control of prices.

While their effort in this direction may have been attended by a measure of success, it is undoubtedly the case that the trade while inclined to acquiesce in a system which would give them a handsome profit in handling goods are disposed to be restless under the restrictions which the association places upon them, and it is thought not unlikely, if the manufacturers continue drawing the cords more tightly, that the large trade will become restive, and protest against what they regard as arbitrary dictation. The requirement of the affidavit in regard to Cartridge

sales is regarded as especially obnoxious. The disfavor with which pools and combinations are held by the trade, and the satisfaction taken by many merchants in circumventing them, is also an unobserved but potent factor in the situation.

While there are rumors in regard to the formation of a new Cartridge company in which the Meacham Company will be interested, the question of the ability of the latter to obtain goods during the next few months is one of especial importance. The general opinion is that they will be able in one way or another to obtain such Cartridges as they may require for sale to the small trade at the slightly cut prices which it is their policy to make, and that they will thus continue to cause more or less irregularity in the market. In the meantime trade is exceedingly quiet, there being a widespread feeling that there may be a reduction in prices. In these circumstances it is maintained by many that it would be the part of wisdom for the association to make some terms with the Meacham Company if this were found to be feasible. Of their willingness to do this, however, the association give no intimation, and, if they should do it, it would be regarded by the trade as an evidence of weakness. It remains to be seen what further action they will take with a view to improving a situation unsatisfactory both to them and to the trade at large.

Miscellaneous Prices.

The following is the price list of the Champion Safety Lock and Novelty Company, Cleveland, Ohio, to whose Side Window and Meeting-Rail Window Sash Locks we have before alluded. The list prices are subject to a discount of 60 per cent.:

The Champion Safety Side Window Sash Locks and Fasteners Combined.

No.	Per doz.
10, Malleable Iron, Bronzed.....	\$1.20
12, Malleable Iron, Polished Face, Bronzed, 1.40	
15, Malleable Iron, Bronzed, Nickel-plated face.....	1.80
18, Malleable Iron, Plain, Bronze-plated..	1.75
20, Bronze Metal, Plain.....	3.50
25, Bronze Metal, No. 4 Finish.....	3.50
28, Bronze Metal, Nickel-plated.....	3.60

The Champion Safety Meeting-Rail Window Sash Locks.

No.	Per doz.
103, Iron, Bronzed.....	\$1.25
105, Iron, Bronzed, with Bronze Metal Lever.....	2.00
107, Iron, No 1 Finish.....	2.25
109, Iron, Polished and Bronze-plated....	2.25
110, Iron, Plain, Polished and Bronze-plated.....	4.50
111, Real Bronze Metal, No. 1 Finish.....	7.00
113, Real Bronze Metal, No. 3 Finish.....	7.00
115, Real Bronze Metal, Plain Finish.....	7.50
117, Real Bronze Metal, Nickel-plated....	9.00
119, Real Bronze Metal, Plain Finish, Large Size.....	17.00

The following prices on Clothes Wringers, Mangles, &c., are announced by the Lovell Mfg. Company, Erie, Pa. The following is their Clothes Wringer list, which is subject to a discount of \$2.50 per dozen; terms f.o.b. Erie, net 60 days, 2 per cent. discount for cash in 10 days:

Clothes Wringers.

No.	Per doz.
XX, Invincible, with Rowell gears.....	\$36.00
No. 11, Princess Bench Wringer, with Rowell gears.....	39.00
No. 10, New Princess, with Rowell gears.....	27.00
No. 2½, Princess, with Rowell gears.....	27.00
No. 1½, Princess, without gears.....	25.50
No. 2, Phoenix, with cogs.....	27.00
No. 1, Phoenix, without cogs.....	25.50
No. 2, Old Reliable.....	22.50
No. 3, Old Reliable.....	27.00

Their Clothes Mangles, Folding Wash Benches, &c., are sold as follows, terms f.o.b., net 60 days, 2 per cent discount for cash in 10 days:

Clothes Mangles.

	Per doz.
Economist Mangle.....	\$60.00
Terms, f.o.b. Erie; net 60 days; 2 per cent. off 10 days.	

Folding Wash Bench.

	Per doz.
Folding Wash Bench.....	\$12.00
Folding Wash Bench, with Wringer stand.....	15.00

The Stanley Rule and Level Company make no changes in their prices or discounts on July 1. They have added one quite novel tool to their line of specialties, a description of which will be found in our columns, page . This tool has been christened *Odd Jobs*, as indicating by the name its many uses. The manufacturer's price is 75 cents each, with a discount to dealers of 20 and 10 per cent.

A slight advance has been made by the associated manufacturers in the price of Wringers. Instead of the abatement from list of January 10 of \$3, as heretofore, it is now \$2.50; terms, f.o.b., 60 days, with 2 per cent. discount for cash in 10 days.

Door Locks do not show any evidence of improvement, but are apparently in a worse condition than for some time. Net prices representing exceptionally low quotations are more frequently made and a disposition is shown by the manufacturers to induce sales by offering low prices.

Padlocks are somewhat weaker in price, quotations made during the last season being now slightly shaded.

Since our last report the market for Wrought-Iron Pipe has shown no further settling, the low prices then referred to still continuing. At present quotations it is thought by well-informed parties that Pipe would be a safe purchase, as it is not likely to go much lower and will probably in the near future be held at somewhat higher figures.

At the meeting of the manufacturers of Squares held last week it was found impracticable to continue the control of prices, and the market is now an open one. As a consequence materially lower quotations than have prevailed for some time are now made, and this line of goods is regarded as somewhat demoralized.

Bright Wire Goods are also in an unsettled condition and lower quotations are made. The competition in this line is animated, and it is intimated that it is not probable that there will be a material improvement immediately.

A reduction has been made in the prices of Cast Butts, which are now quoted at discount 70 and 10, with only a small extra to the large buyers. The destruction of the works of the Reading Hardware Company, referred to in another column, may have some effect in strengthening the market, as the production of goods is thus for a time materially diminished.

The new prices for Carriage Bolts have gone into effect and the action of the manufacturers is generally regarded with satisfaction. The regularity that is thus promised in this line, with the reasonable prices established, apparently meets the approval of the trade.

The Philadelphia Pattern Carriage Bolt market is reported to be unsettled and weak, and some low quotations have been made. It remains to be seen whether or no it will be feasible to correct this condition of things.

Machine Bolts and Bolt Ends are also offered at slightly lower prices with only a moderate demand.

Items.

The Atha Tool Company, of Newark, N. J., for whom C. H. Gurney & Co., of Chicago, are general Western agents, have issued a new illustrated catalogue and price list of the steel tools which they manufacture, embracing Adzes, Axes, Chisels, Hammers, &c. It is a book of 146 pages, bound in cloth, with heavy

boards and beveled edges and is a most excellent specimen of fine printing and engraving. The peculiar trade-mark of the company occupies a conspicuous position. It consists of a capital A inclosed in a horseshoe, on which the name of the company curves round the toe. The official Steel classification is printed in full on the closing pages of the catalogue.

The catalogue and price list of J. H. Sternbergh & Son, the Reading Bolt and Nut Works, Reading, Pa., is elegantly printed in red and black on paper of exceptionally fine quality. It represents the varied line of goods which they are manufacturing, with list prices revised to date. They also call attention to their machinery for Bolt and Nut manufacturers and state that they are prepared to manufacture Bolt heading, pointing and threading machines, shears for cutting blanks, Hot-Pressed Nut machines and Nut-tapping machines, of which they make several sizes of each, adapted to all classes of work.

We regret to have to announce the destruction of the work of the Reading Hardware Company, Reading, Pa., by a fire which occurred last evening. The fire originated in the polishing department which occupied a central position in the extensive plant, whence it spread rapidly to other buildings, so that in a short time the entire works, with the exception of one foundry, were completely destroyed. The parts burned included the pattern shops, the warehouses, the polishing and nickel-plating departments, packing department, the engine and boiler houses, the japanning and finishing departments and the offices. These buildings contained a great quantity of valuable machinery, patterns, materials and finished goods and the loss is estimated at from \$250,000 to \$350,000.

In the list of the associated manufacturers of Carriage Bolts which was given in our last issue the address of the Anderson Bolt Company was erroneously given as Indianapolis, Ind. It should have been the Anderson Bolt Works, Anderson, Ind. Their card emphasizes the fact that they use natural gas, and refers to Common Carriage Bolts, Machine Bolts, Lag Screws, Bolt Ends, Bridge Bolts and Hot-Pressed Nuts as manufactured by them.

A recent transfer of property and change of business in which the Buffalo Wire Drawing Company are concerned has been given publicity in the daily press of that city. We are desired to state that the Buffalo Wire Works, Scheeler & Sons, are not connected with the above company, as might possibly be inferred from the similarity of names.

J. H. Sternbergh & Son, Reading, Pa., are sending out nickel-plated Hexagon Nuts which are intended for use as paper weights. While they serve this purpose admirably they are also utilized in calling attention to their manufactures of Bolts, Nuts, Rivets, Washers, Iron, &c.

Elsbre & Mix, Sherburne, N. Y.; have transferred their stock and business to a new firm, Conley & Ingham, who will carry it on at the old stand.

The Keokuk Novelty Company, Keokuk, Iowa, C. H. C. Burlingame, president, issue a circular describing their Sure Shut Spring Hinge, the advantages of which are pointed out.

Porter & Wooster, 66 and 68 Beverly street, Boston, Mass., so long and favorably known throughout the country as manufacturers of Carriage Hardware Specialties, dissolved partnership July 1. Both partners will continue business at their present location, Mr. Porter manufacturing the Easy Bolt Clipper, and Mr. Wooster manufacturing the other goods

heretofore made by the firm, with the exception of Body Corner Irons. This branch of their business has been sold to C. Cowles & Co., New Haven, Conn. The firm is referred to as having been successful, and in this new departure the partners are regarded as having excellent prospects.

The Pennsylvania Bolt and Nut Company, Lebanon, Pa., for whom Topping & Fox, 96 Chambers street, New York, are agents, have issued an illustrated catalogue and price list in which they exhibit the line of Bolts, Bolt Ends, Lag Screws, Nuts, Washers, Turn Buckles, Forgings, Boiler and Bridge Rivets, &c., of which they are manufacturers. A full-page illustration is given of the extensive works of the company.

We are advised by Quernheim & Heckell St. Louis, Mo., that they are general agents for the Moser Bundle and Package Carrier, manufactured by the Moser Holder Company, Belleville, Ill., and that they are prepared to negotiate with responsible parties for the exclusive sale of these goods in their respective cities. Hibbard, Spencer, Bartlett & Co., Chicago, Ill., are referred to as having the exclusive sale of these goods for that city.

Hartley & Graham, 17 and 19 Maiden Lane, New York, announce that they are prepared to furnish the trade with improved quality Shot Shells of the Union Metallic Cartridge Company, packed in new boxes with fancy lithographed labels, samples of which are at the same time sent out. These new labels are attractively printed with appropriate illustrations.

The Francis Axe Company, Buffalo, N. Y., in their advertisement, occupying page 62, call attention to the All Steel Axes, illustrating also some specialties. The trade will observe that it is intimated that special rates will be made for immediate orders to be shipped by September 1.

Nimick & Brittan Mfg. Co., Pittsburgh, Pa., send out a circular of the House Automatic Liquid Door Check and Spring, which they are now manufacturing. Illustrations are given explaining this article and pointing out its utility. The House Liquid Door Check and Buffer is also shown.

W. B. Belknap & Co., Louisville, Ky., under date July 2, issue in a four-page circular the new cards for Cut and Wire Nails, with a table giving the length and thickness of the latter. In the circular to the trade these Nails are referred to as having been often characterized as the Nail of the past and the Nail of the future respectively, but are stated to be to them the Nail of the present, as large stocks of both are carried.

Recknagel & Co., 106 Broad street, New York, send out a circular relating to the Cataract Washing Machine, for which they are agents. It gives a description of the machine, pointing out its special features. That the interior of the machine is free from bolts, screws, nuts, rivets or anything liable to tear the clothes is emphasized. This machine has been offered to a limited extent and this house is now preparing to put it on the market more generally.

The Philadelphia Milk Shaker Mfg. Company, corner Thirteenth and Buttonwood streets, Philadelphia, Pa., issue a circular describing the Milk Shaker which they are manufacturing, and also an Ice Shaver.

The E. S. Greeley Company, 5 and 7 Dey street, New York, issue a circular relating to Tamer's Patent Telephone Attachment, which is for the purpose of increasing the distinctness with which a Telephone is heard, preventing the rattling of the trans-

mitter diaphragm, &c. They also issue a leaflet in which the Electricians' Pocket Tool is illustrated. This article comprises a Birmingham Wire Gauge, the French millimeter and English inch comparative Scales, Screw Driver, Wire Cleaner, Pencil Sharpener and a Wrench.

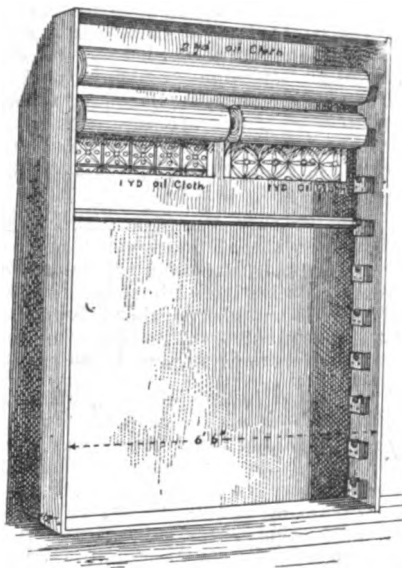
The Union Indurated Fibre Company, 37 Barclay street, New York, are sending out a circular relating to Paper Bags, which they are offering at low figures. These Bags are made by the well-known firm of L. Waterbury & Co., and have on them an advertisement of Indurated Fiber Ware, in which the advantage of this Ware over ordinary Woodenware is pointed out. These Bags are furnished at the following prices with the company's advertisement on:

2 pound standard.....	\$1.25 per 1000
4 pound standard.....	1.80 per 1000
2 pound special.....	1.00 per 1000
4 pound special.....	1.45 per 1000

They will add a merchant's card not exceeding three lines at slight additional cost.

Convenient Store Fixtures.

In our issue of several weeks since we briefly called the attention of our readers to some of the methods employed by Mr.



Convenient Store Fixtures.—Fig. 243 —Oil Cloth Rack.

Charles W. Davis, of Wabash, Ind., in the arrangement of his stock of shelf hardware, &c., and referred among other things to various devices used in the display of his goods. Supplementing what

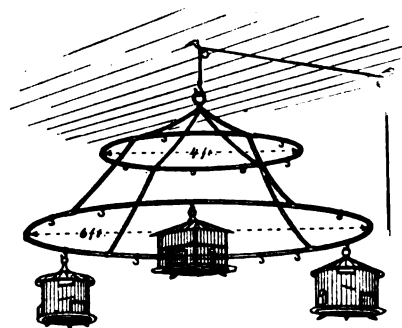


Fig. 244.—Gas-Pipe Rack for Cages.

then appeared, we present by means of the accompanying illustrations several views of the devices referred to. In Fig. 243 we show a rack adapted for the display of floor oilcloth, which is of a sufficient width to receive one roll of eight-quarter

or two rolls of four-quarter cloth. The rack is described as being set in the shelving, and is 6 feet 6 inches wide, 12 feet high and 12 inches deep, made of 2-inch poplar. It is provided with a series of rolls, octagonal in shape, placed 10 inches

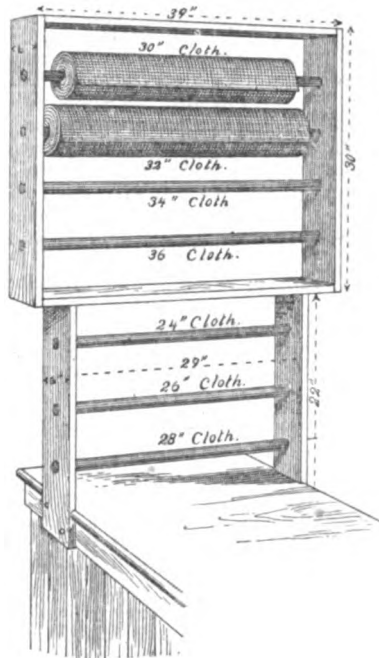


Fig. 245.—Rack for Wire Screen Cloth.

apart, or a sufficient distance to allow of a full roll of oilcloth or linoleum. The rolls are $2\frac{1}{2} \times 2\frac{1}{2}$ inches. Mr. Davis informs us that this rack may be placed on the wall at the end of the shelving or be built in the shelving, as may be preferred, and extended upward to the ceiling. The general arrangement of the rack, with several rolls of oilcloth in position, is shown in Fig. 243. In Fig. 244 is shown a bird cage rack made of gas-pipe. It is composed, as will be seen from an inspection of the engraving, of two rings, the upper one being 4 feet in diameter, while the lower

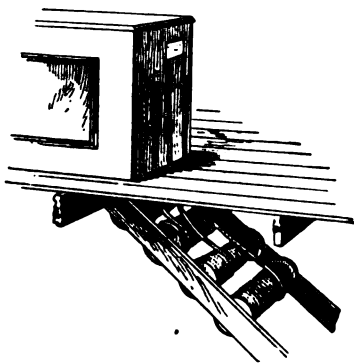


Fig. 246.—Rack Showing Method of Handling Rope.

one has a diameter of 6 feet. The two rings are connected by means of gas-pipe, which renders the rack firm and durable. It is suspended by means of a chain which runs over double pulleys to the side of the room and then down within convenient distance from the floor. This enables the cage to be readily lowered for the purpose of examining the goods suspended from it. It has a capacity for 30 cages. In Fig. 245 of the illustrations is shown a perspective view of the rack employed by Mr. Davis for holding wire-screen cloth. As will be noticed, the standards supporting the lower section are fastened to the sides of the counter in such a way that the cloth may be easily unrolled and measured upon the counter. The rolls upon

which the wire cloth is placed are $1\frac{1}{4}$ inch in diameter, and upon each end is placed a tin cap, fastened to the roll by means of a single screw. The lower section of the rack admits of rolls of cloth 24, 26 and 28 inches in length, while the upper section has a capacity for 30, 32, 34 and 36 inch cloth. Fig. 246 of the illustrations shows the method of handling ropes adopted by Mr. Davis. The rack is placed in the cellar at such an inclination with the ceiling that the coils of rope do



Fig. 247.—Wire Catch for Holding End of Rope.

not interfere with one another. The end of the rope from each roll is passed up through holes in the floor and fastened to the end of the counter by means of a catch made of No. 12 spring wire. An enlarged view of this catch is shown in Fig. 247 of the illustrations. At the end of the counter and just above the ends of the rope is placed a sheet giving the weights and number of feet to the pound of the various sizes of rope in stock. All the goods upon the shelves are protected from dust by doors hung to narrow strips, with parliament butts, the whole being painted red. The method of showing samples adopted by Mr. Davis is to hang or screw them fast in front of the same goods found upon the shelves. By this means all the shelving space can be used to advantage, and permits of the goods being kept in original packages.

Movable Fronts for Stores.

An improvement in shop fronts was patented in this country not long since by John Gooch, of Brompton Road, London, Middlesex County, England. Patents on the same improvement have likewise been issued in Great Britain, France, Belgium, Norway, Germany, Sweden, Canada, Italy, Victoria, Tasmania, New Zealand, South Australia, Spain, New South Wales, Austro-Hungary, Queensland and India. It is evident from this impressive list of countries in which the invention has been secured that the author of the idea has faith in its utility and also in its general adoption by the business public. The improvement relates to those stores or shops in which the lower floor is used for business purposes and the stories above for residence. The object is to provide means by which the whole extent of the frontage between the side walls during business hours can be rendered available and used for the display of goods and for business purposes in general, and by which a side or private entrance can be provided when the store is closed. The invention consists essentially in features of construction of the shop front. The show windows and store entrance are adjustable relatively to other parts. During business hours the movable front part or parts are separated one from the other so as to open up an entrance to the store from the front, presenting at this time the conventional store with show windows at the sides and door in the middle. When this entrance is closed up by the reverse movement of the parts, the private entrance or entrances to the house as the case may be are brought into use. As a rule, where buildings are put up for the combined purpose of a store on the first floor and residence above, the latter connecting with the front by stairs, or with residence in the rear of the store,

communicating with the front by a side hall, it is necessary to sacrifice a portion of the width of the store, more particularly of the show windows. This invention proposes to utilize the entire front for show window and entrance purposes in business hours, and yet have the private entrance available for all other times. In the patent drawings mentioned one view shows a store front occupying the entire width of the building in business hours and showing two private entrances when the store is closed, and provided with a sliding or rolling blind adapted to come down to cover the entire store front when the private entrances are employed.

Business Methods.

A neat and effective method of bringing goods to the attention of the consumers is adopted by Hoopes, Brother & Darlington, Westchester, Pa., in a dainty pamphlet devoted to their Warner Wheel. As it may be suggestive to manufacturers or merchants in other lines we reproduce its substance below. The front cover contains the words, "For the man whose business it is to buy your wagons." The Warner Wheel is then referred to in the following terms:

Our Warner Wheel is never to fail at the weakest spot in other wheels. But what if it does?

Exact from your wagon-maker the bargain we make with him—new wheels for old if they fail at the hub, with no limit of time or anything else but unworkmanlike work on the wagon-maker's part.—See postscript.

It is better to make this guarantee through your wagon-maker. We make it to him; and he makes it to you. For we deal with him; and he deals with you.

We make, as most wheel-makers do, four grades of wheels, alike except the wood they are made of. We have to, besides, to humor the wagon-makers—there are just as many grades of wagon-makers as there are of wheels.

The best of oak and hickory grows in this part of the United States; but there is oak and oak, and hickory and hickory. Out of the self-same log are brittle and middling and good and tougher than steel.

There isn't nearly enough tough wood in the world to make the wheels all tough. There isn't any need of all the wheels being tough. Why tough wheels for a tender wagon? and most of the wagons are tender.

But, after a wheel is painted and varnished, who can tell the brittle wood from the tough till it breaks?

So go to the wagon-maker who, you judge—but make him prove it—will give you the best of wood in your wheels; then make him repeat our guarantee.

Most wheel-makers make four grades of wheels, we said; but they don't all use the same marks. Our marks have always been XX for best, X for next best, No 1 for next, No. 2 for next lowest—the worst we burn. But some of the makers mark their wheels XXXX, XXX, XX and X. Don't let those extra X's make you think their wheels are better than ours.

Half the wheels we make go to London and Paris. They are finding out on the other side where the best materials come from.

Now and then a Yankee imports a French or English wagon and gets our wheels. Two freights and a duty! No matter; salt water and a little jingle of silver don't hurt 'em. Such wheels are worth paying for.

The necessary cost of our wheels is very little more than that of the next-best make, whatever that make may be. But what do you think of a method of making that makes the weakest spot in a wheel the strongest? If the argument is as good as the wheel, you will want our wheels.

POSTSCRIPT.—We make this limit to our guarantee, if it is a limit: If a wagon-maker bores a hub for too large a box, he must take the risk, not we; the same if he puts on too light a wheel for the axle. These are what we mean by unworkmanlike wagon-maker's work.

This limit is proper for us, not for the wagon-maker. He can give you a still stronger guarantee. We take the risk of our wheels. Let him take the risk of his work in addition.

But the owner must keep his tires tight. It would be absurd to guarantee a wheel with the tires neglected.

Uniformity in Marking Goods.

A correspondent takes up the subject of uniformity in marking goods, and presents the following views:

Do those of your readers who are engaged in the sale of shelf goods extensively think of the great importance of system and uniformity in putting prices on such goods as tinware, wooden ware and general stock of housekeepers' articles? Is it not too true that much is left for guesswork, and the fact that a dinner-pail is generally sold for 25 cents fixes that as the figure until a competitor has made an advance or a cut in the price? Suppose they cost \$1.75 per dozen, and the dealer has adopted a general rule to add 50 per cent. profit on tinware. The pail would then be marked 22 cents, but nine out of ten would mark it either 20 cents or 25 cents, to make it "even figures." The trouble growing out of a lack of uniformity is that a part of the dealers charge 20 cents and a part 25 cents, and no one knows until he loses sales that he is charging too much. I am going to advocate a cast-iron rule of fixing a profit on all lines of goods and then marking them to the nearest figure, leaving out fractions. If it is 25 per cent. on wooden ware, and the dealer buys a lot of pails for \$2.25 per dozen, they will retail for 28 cents. On cutlery he thinks 33½ per cent. profit right, and a set of knives that cost 88 cents should be marked at \$1.17 per set—no more and no less.

Another mistake made by many dealers is to mark goods after looking at them and estimating what they will bring. A dealer thinks a bread or cake box looks big for its cost and will mark 75 cents for one that costs 35 cents. Here he is all at sea again—no rule or system, and the competitor that has a rule, and sells the cake box for 53 cents gets his full and fair profit, and a customer for future purchases. Many dealers are too much engaged in their financial and other office work to see to marking goods, and the invoice is given to a salesman who is supposed to know at what figure to mark the goods, but if he has a rule, as stated, he can make no mistake however little experience he has had. This plan of doing business leaves the more busy employees to attend to duties that need their especial knowledge. The same rule could be applied to stoves with only the slight variation of calling the retail price at the nearest quarter-dollar fraction. A stove costing \$11, and sold on a 33½ per cent. profit, would be worth \$14.66, but for convenience it could be marked under the rule \$14.75. In stoves there would need to be one line of profit for certain goods as the leading lines, and another for cheap goods.

A feature of my plan is that it could so readily be made the basis for mutual agreement with dealers who are in the same locality as to have a uniform asking price for goods. I am not in favor of combinations in which all in a trade agree upon their "honor" to sell at a certain price and never vary from it. I am too old for that by a large majority, and if I wanted to set men who had been life-long friends at enmity I would recommend a combination on prices. It is business-like and helpful, however, for dealers to fix a profit percentage on the various lines of goods they sell and will go a long way toward uniformity and fair prices. It is, moreover, an easy thing to agree upon, as there is so little detail to it. Perhaps the most difficult line would be in stove repairs, but to-day there is more uniformity in both

the wholesale and retail prices of castings, fire-brick, &c., than on any other goods sold. All that would be wanted would be a list drawing the line on heavy castings, like furnace fire-pots, for one line at a fixed percentage, and another for stove repairs, grates, cross-pieces, fire-brick, &c., all as simple as tin pans and shelf goods when understood. Now let us see the result and notice the advantage gained. A man wants a coal hod and is charged 71 cents for it. He first wonders why the 1 cent is put on and the next moment sees that it has been figured in a business way and that he is only charged the close price that the article could be afforded at. If the price given had been 70 cents, quite naturally he would want it for 65 cents and the seller is only required to say, in case a reduction is asked from the 71 cents, that it has been marked carefully at his lowest margin of profit, and the odd figures corroborate what he says. Then I would let the customer leave the article before I would take off the 1 cent!

The best proof I can offer that this plan is a good one is that I have tried it myself and obtained my theory from practice. The strongest hold that a merchant can secure on his customers is to show them that he runs his store himself, on his own money and in his own way, and that when he sells an article to a man who is not niggardly enough to "beat down" on it he pays no more than one who is a bore. The very highest position that can be obtained in mercantile life is to have a name that is a guarantee for the price put on the merchandise.

Excellent Work of a Spiegel Furnace.—Mr. G. C. Stone, of the New Jersey Zinc and Iron Company, Newark, N. J., gives us the following excellent record of one of the spiegel furnaces of that company: "We have now one furnace in blast, blown in May 15, and one out relining, to be blown in as soon as completed, probably about August 1. The furnace now out made the longest blast we have ever made here, and the longest run on spiegel that I know of, being in blast three years and two days. The product was:

	Tons.	Cwt.	Pounds.
First year.....	3340	10	70
Second year.....	3443	13	57
Third year.....	3090	8	79
Total.....	9874	12	94

The average yield of ore was only 31.5 per cent. The spiegel averaged 19.55 per cent. manganese. It required 2 tons, 9 cwt., 22 pounds of coal to the ton of iron, and made about 6000 pounds slag to each ton of iron."

Relative Value of Silver and Gold.

—In discussing the relative values of silver and gold, the London *Daily News* publishes figures to show that, notwithstanding the decline in the value of silver, its production has continued to increase at the same time that the annual supplies of gold have increased. Early in the present century the annual production of gold was about \$10,000,000 on the average. After the great Californian discoveries the production rose for a time above \$150,000,000, but for a series of years following the year 1859 the average was rather above than below \$100,000,000. Of late the production of gold has been somewhat under \$100,000,000 yearly. Of silver the supply varied between \$40,000,000 and \$52,500,000 for the 20 years ended with the year 1870; but no sooner did the value of silver begin to fall than the production steadily increased, until it is now nearly three times as great as it was a generation ago.

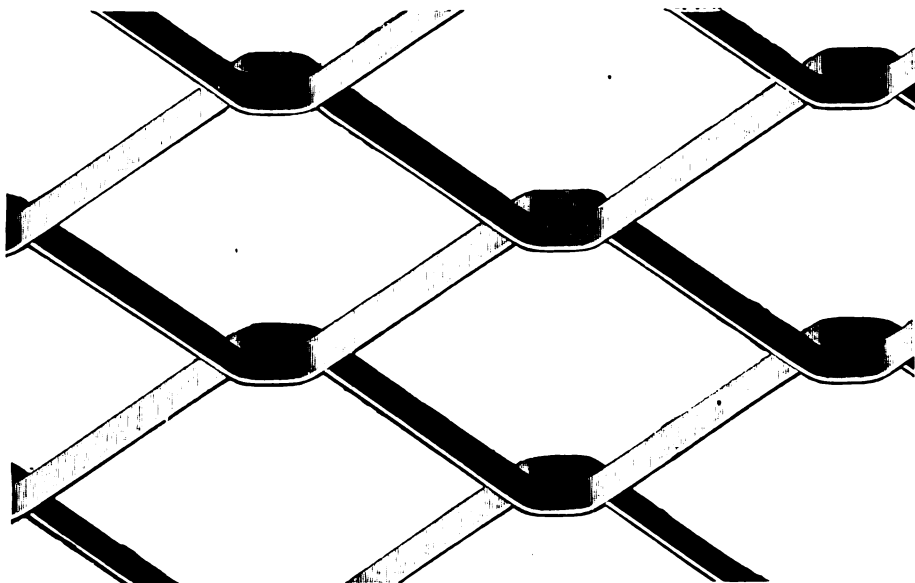
Expanded Metal.

The accompanying illustration represents a new metal product known as expanded metal. In form it resembles woven wire netting, and is intended to be used for the same purposes. It is made of sheet metal, cut in alternate slots by special machinery and expanded into open network, the sheets being increased in area from six to ten times, depending upon the size of the mesh. The cut gives a side view of the netting to show the

England, the South Atlantic States and the Central South, and propositions are being received from several parties desiring to take hold. An English syndicate is being organized to conduct manufacturing operations in Great Britain.

The machines now in use for the manufacture of expanded metal are somewhat similar to a cornice brake, but fitted with a series of knives or cutters, one for each slot. These knives make but one-sized cut, different meshes, therefore, requiring different machines. The sheets of metal

such as is used for flour sieves, fly screens, &c. A very large field is found outside of these lines, however, as will be observed by reference to the catalogue. Lawn fencing, elevator guards, aviaries, summer doors for ventilation, arbors, vine and vegetable supports, farm and railroad fencing, farm gates, flower-bed inclosures, delivery-wagon screens, store partitions, poultry netting, skylight guards, tree boxes, desk railing, window guards, swinging signs and even door mats are among the uses enumerated, to which can be added a variety of special places in which wire netting is found desirable. The same principle is applied in the manufacture of steel fire-proof lathing. The manufacturers point out one essential difference between wire netting and expanded metal which is worth noting. Wire netting for the heavier uses must be made to order, while expanded metal can be carried in stock and is easily cut with shears or cold chisel to any shape required without leaving broken ends to be pulled or dropped out, as in the case of wire. The catalogue comprises 47 pages of very interesting matter, which will be sent to any address on application to the company at 60 West Monroe street, Chicago.



Expanded Metal.

shape of the metal, both in the strands and at the points of union.

This article was invented in 1883 by J. F. Golding, of Chicago, and a patent covering the principle of its manufacture was obtained by him in 1884. Additional patents were subsequently secured on the different features of the machinery used to produce it. Oscar Bradford, president of the Curtiss & Co. Mfg. Company, and Henry S. Turner, of St. Louis, being convinced of the value of the invention, acquired an interest in it and contributed toward its successful development. In connection with Mr. Golding they have organized the Expanded Metal Company, controlling every feature of expanded metal and the necessary machinery in the United States and several foreign countries.

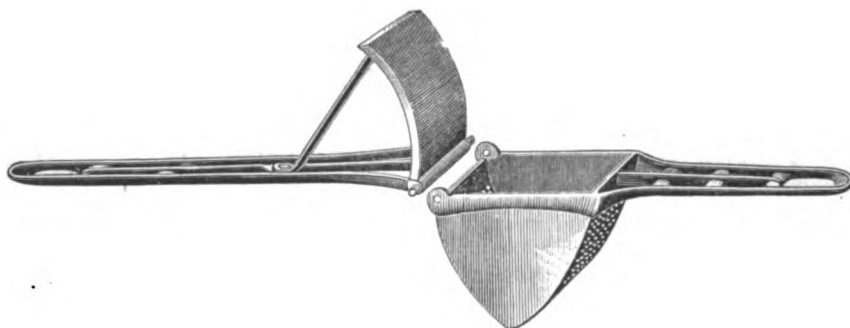
The usual difficulties were encountered in putting a new industry on a successful mechanical and commercial footing. Experiments in building machines were attempted at Chicago under the direction of the interested parties, but the only point accomplished was a demonstration of the practicability of the invention. Long & Allstatter, of Hamilton, Ohio, were then consulted, and they undertook to erect machines guaranteed to work, succeeding after a great deal of experimenting, which involved unavoidable delay. It is quite recently that all difficulties were surmounted, but three machines are now in full operation making expanded metal at the company's factory at Hermosa, six miles from Chicago, on the Chicago, Milwaukee and St. Paul Railroad. Facilities exist at these works for extensive operations when the growth of the business demands them. The Chicago office of the company is at 60 West Monroe street. Licenses to manufacture for exclusive territory have been issued to companies at St. Louis, San Francisco and Pittsburgh, in each of which places factories are or will shortly be in operation. Three other districts have been set off for exclusive control by separate licenses—namely, New

fed to the machine, of course, vary in size, according to the character of the product desired. A sheet 9 feet long and 7½ inches wide, for instance, is expanded to 3 feet in width but reduced to 8 feet in length. The sheet, after insertion in the machine, is fed automatically, cut and expanded at the same time, and is delivered without further attention. A 25 horsepower engine will furnish sufficient power to operate four machines. One machine will produce in ten hours, from No. 18 sheet, 10,000 square feet of expanded metal for use in window and skylight guards, around elevator shafts, in lawn fences, &c. The manufacturers claim for

The Diehl Fruit Press and Vegetable Strainer.

This article, which is manufactured by Paine, Diehl & Co., Philadelphia, Pa., is shown in the illustration given herewith, which represents the two parts separated. It will be recognized as substantially the same as the P., D. & Co. press and strainer, with a modification by which the plunger can be conveniently and quickly removed so as to facilitate its use and the emptying or cleaning of the cup. The manufacturers call attention to the very considerable improvement which is thus made in the press, adapting it to other uses and making it more convenient for those to which it has heretofore been applied.

Official trials of a new form of log have recently been made on board some of the French torpedo boats. The log is made of bronze of cylindro-conical form, and weighs about 5.5 pounds. It is provided with a hollow tube running down its center, which is connected by a canvas-



The Diehl Fruit Press and Strainer.

it great strength, as well as decided cheapness, in comparison with hand-woven wire. New uses are also expected for it, an inquiry coming from the engineers in charge of the Mississippi River improvements, who state that it is well adapted for the manufacture of mattresses used in retreating.

The company have issued an illustrated catalogue, which shows the great variety of purposes for which this netting can be used. At present nothing finer than 1-inch mesh is made, so that the expanded metal does not compete with wire cloth,

covered india-rubber tube to a pressure gauge on board. When the ship is under way the flow of the water past the log establishes a partial vacuum in the tube, and causes the pointer of the pressure gauge to move over its dial, which is graduated to give the speed of the vessel from 4 up to 25 knots.

Four artesian wells in Galveston are yielding copious supplies of water. The first one put down is expected to furnish, when completed, 1,000,000 gallons per day. It is not yet down 500 feet.

Some New Forms of Oil Cans.

We have referred in the past to the oil cans manufactured by W. J. Clark & Co., Salem, Ohio. In addition to the well-known lines that this firm have been supplying in the past, novelties are being continually brought out, and two of the most recent are shown in the accompanying engravings. The first represents a cheap form of can, similar in all respects to the C-jacketed can illustrated in these columns



Fig. 1.—Clark's C-Can without Jacket.

some time since, save only that the slatted jacket is omitted. The pump turns in its position, so as to make it convenient to fill a lamp at the side as shown. The pump is connected with the can by screws and a screw is also used at the top. The can is conveniently carried by a bail, and in all respects is portable, combining high utility with great convenience.

Figs. 2 and 3 represent what the firm describe as their rotating can. The can

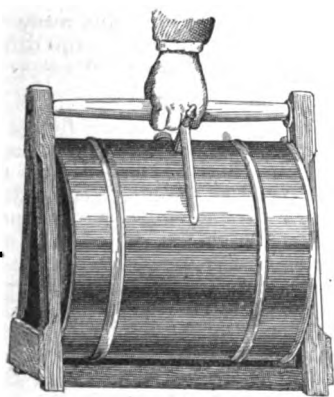


Fig. 2.—Clark's Rotating Can as it Goes to be Filled.

is swung in a frame which serves as a handle to carry the can when it goes to be filled. The two engravings illustrate the use of the can so clearly that it will be understood without explanation. When the can is being used for filling a lamp it is set upon the edge of a table or bench as shown in the third engraving. Both hands may be used in handling the lamp, simply a finger being engaged with the spout to pull the can forward, as clearly shown in the cut. After the lamp is filled, by simply raising the lamp and thereby imparting the opposite motion to the can or releasing the pressure, the flow of the fluid is stopped. Referring to

the spout upon this can, it may be remarked that the passage of the oil is not through what would be regarded as the spout, but, instead, is through the brace or support under the spout. By this construction the can can be drained to the

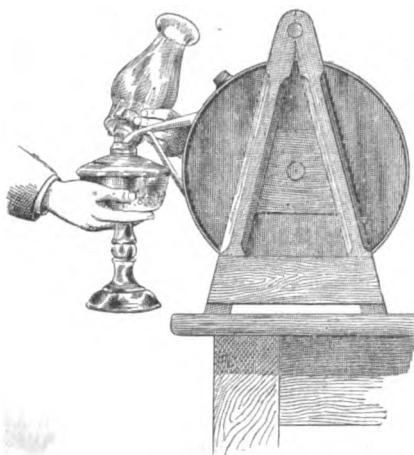


Fig. 3.—Method of Using Clark's Rotating Can.

last degree. This can is claimed to be the only one of its kind that is trunnioned at the ends. It has advantages over side trunnioned cans in point of compactness, and the fact that it rotates within its own space. The contents are always in the same relation to the trunnions, and, accordingly, it is as easy to rotate the can when full as when it is empty, a fact that will be appreciated by all who have occasion to use such a device. There is never any surging of the contents to cause unsteadiness or spilling. The can is provided with an automatic spring locking device which holds it in an upright position whenever at rest, and prevents rotating accidentally in a way to spill the contents. The can is supplied with a large screw-cap filling hole, and as the spout is also supplied with a cap, the device is claimed to be absolutely air-tight, and therefore specially adapted for holding gasoline and other

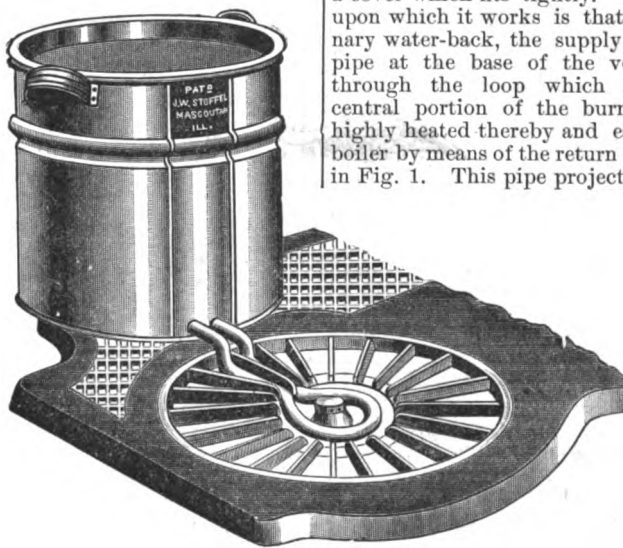


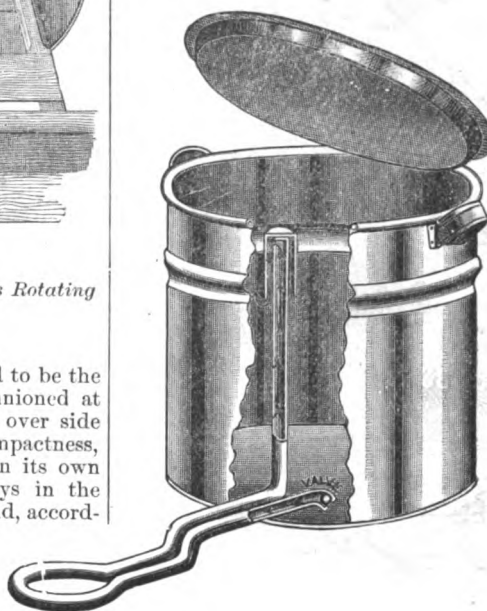
Fig. 2.—The Boiler in Use.

similarly volatile fluids. In a letter recently received from this firm, they remark that they have been in this line of business since 1875, and have in that time produced an assortment of oil cans for family use which are very popular with the trade. They think, however, that in this new can

they overcome certain objections which have heretofore prevailed against swinging cans, and in support of this proposition mention that it has come into instant favor wherever introduced. The can does away with the labor of pumping, and the bother to which pumps out of order subject their users.

Water Boiler for Vapor Stoves.

J. W. Stoffel, of Mascontah, Ill., is introducing to the trade a patent water heater for use in connection with gasoline



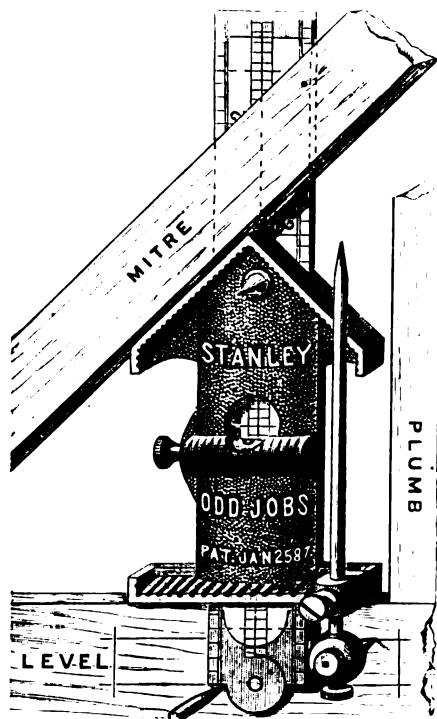
Water Boiler for Vapor Stoves.—Fig. 1.—Perspective View with Side Partially Broken Away, Showing Internal Arrangement.

stoves, two views of which are shown in the accompanying illustrations. Fig. 1 presents the device detached from the stove, and with the side partially broken away showing the internal construction. Fig. 2 of the engravings shows the boiler as it appears when in use. It is constructed of sheet metal and provided with a cover which fits tightly. The principle upon which it works is that of the ordinary water-back, the supply entering the pipe at the base of the vessel, passing through the loop which encircles the central portion of the burner, becoming highly heated thereby and escapes to the boiler by means of the return pipe as shown in Fig. 1. This pipe projects upward to a

point near the top of the boiler, and is furnished with a cap which causes any steam generated to be thrown downward, tending to keep the water hot, while also avoiding noise. The device is simple of construction and adapted for use on vapor stoves of various descriptions.

Odd Jobs.

A new tool has been brought out by the Stanley Rule and Level Company, New Britain, Conn., and 29 Chambers street, New York. It is illustrated in Fig. 6 and is called Odd Jobs, in view of what it will do. It consists of a casting some-



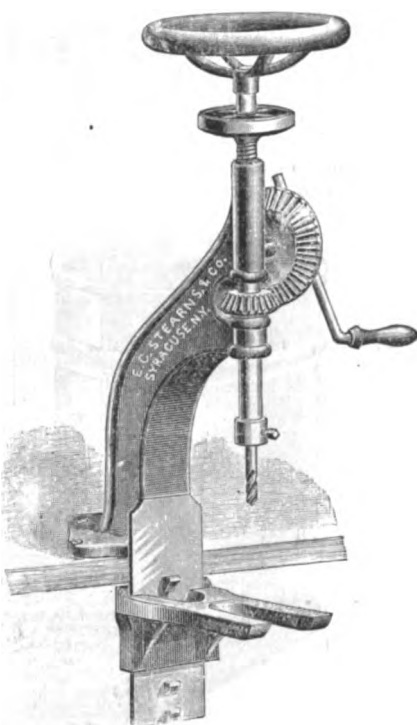
Odd Jobs.—A New Tool Brought Out by the Stanley Rule and Level Company, New York.

what resembling a miniature house gable, with one round window in the end. The gable part, as we have familiarly described it, is a right angle, thus making the tool available for miter purposes and as a tri-square. The base is at right angles to the center line of the casting, thus adapting it for a level. The mercury-tube will be noticed in the cut. The tool is to be used for various purposes in combination with a rule, and, for that reason, the back of the casting is channeled out just the right width to receive an ordinary 2-foot rule when closed. The little set-screw shown at the left in the cut engages with the edge of the rule and holds it in place. With the rule inserted the range of work that may be accomplished will be readily perceived. No less than ten special uses are enumerated in the circular put forth by the company. These are as follows: A (1) tri-square, which is so evident that it does not need any explanation. The same remark also applies to (2) miter square. By combining with the rule and extending one end of the rule below the square head or base already referred to, a (3) T-square is secured. By keeping the rule in the same position and using a pencil or scratch awl in the angle of the rule as shown in the cut (4) a marking gauge is obtained. In the same manner a (5) mortise gauge is secured. By reversing the rule and allowing the opposite end to project beyond the base, a (6) depth gauge is formed. A (7) miter level and also a (8) spirit level are secured in a way already described. A plumb is derived by a line brought against the top and bottom projections as indicated at the right of the engraving. Referring to the cut, near what we have called the gable of the casting, will be noticed a sharp point. This is in line with the end of the groove or channel for the rule on the back. With the rule in the position already indicated, and using the point referred to as a center, a (9) compass or

device for striking circles is obtained and that, too, with the means at hand for adjusting the radius to suit circumstances. Instead of using the rule as above described, the long scribe or point, shown at the right, may be employed, as shown in the cut. The end of the rod opposite the point is adapted to receive and hold a pencil, thus still further increasing the utility of the article in this regard. By using the right-angled edges at the top, which we have familiarly described as the gable of the casting, an (10) inside square for boxes and frames is obtained. We are not altogether certain that the above enumeration covers all the uses to which this tool can be put, but we give them as the enumeration which the company have made and leave our ingenious readers to discover still others. Using the tool as a beam compass, it has a capacity of from 1½ to 13 inches diameter. Smaller circles can be made by reversing the steel rod so as to bring the pencil near the center point. A circle of 25 inches diameter can be swung if the rule alone is used with a pencil in the angle at its head. This little article is being supplied nickel-plated, put up in neat boxes and is a most desirable addition to any carpenter's kit.

Improved Bench Drill.

A few months since we presented in these columns a form of bench drill manufactured by Messrs. E. C. Stearns & Co., of Syracuse, N. Y. In the engraving annexed we show an improved form of the same drill, the special feature being the adjustable bed-plate, which may be raised or lowered to accommodate various styles and sizes of work. It is so constructed, it is stated, that by simply turning a crank the spindle is rapidly fed down to the work and as quickly withdrawn. The drill is 26½ inches, measured



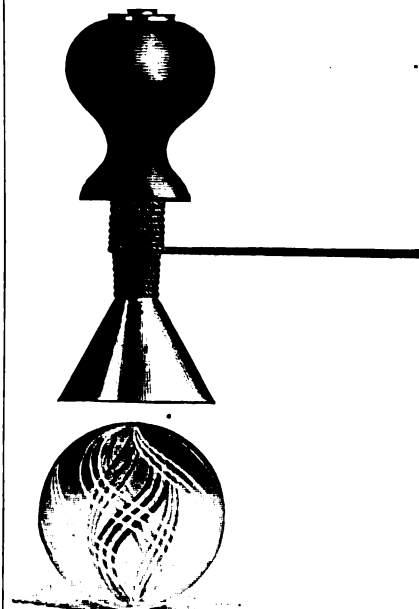
Stearns' Improved Bench Drill.

from the base of standard to top of balance-wheel, and weighs 29 pounds. It is claimed to have a capacity for drilling any size of hole at a right angle with the bed-plate, from ¼ inch down to the smallest required. The drill-stock is 1½ inch in diameter, the run of the screw 3½ inches and the weight of the balance-wheel 6 pounds. With each drill is furnished a chuck, which attaches to the

spindle and holds a ¼-inch round drill or an ordinary square-tapered shank or brace drill. The drill is made of the best material, the main standard is neatly japanned, the hand wheel nickel-plated, the balance-wheel painted vermilion, while the bearings are finished with standard size reamers, with all parts interchangeable. The crank, as will be noticed by referring to the engraving, has an extension for large drilling, and the manufacturers state there are proper allowances for strength and durability.

Agate Spinner.

This toy is manufactured by the Wire Goods Company, Worcester, Mass., and is represented full size in the accompanying



Agate Spinner.

cut. Its use is sufficiently indicated in its name and in the illustration. It is stated that by means of it an agate may be made to spin on a dinner plate or other smooth surface from five to eight minutes. These articles are packed in neat boxes, containing each one spinner with agate, ready for retailing, having on the outside full directions in regard to the manner of use.

Continuous Steam Heating for Cars.

—In summing up what was said of continuous steam heating for cars at the recent Master Car Builders' convention the *Railroad Gazette* remarks: "It seemed to be generally acknowledged that the results given by the various systems used were fairly satisfactory. It was also noticeable that while no reference was made to the difficulty of heating cars should the engine be stalled or break down on the road, numerous speakers stated that they had made arrangements for keeping the cars heated while they were standing at stations, junctions and terminal points. It seems to be a very general practice to keep the cars warm throughout the whole winter and to couple them up to a stationary boiler when the cars are standing and the locomotive is not available. None of the speakers appeared to have found any difficulty in carrying this into effect, while no complaint was made that the quantity of steam used in heating formed an appreciable tax on the steaming power of the locomotive."

The limited partnership of William D. Marvel & Co., Nos. 68 and 70 William street, has been dissolved by mutual consent. The Marvel Iron Company, Limited, and William D. Marvel will continue business at the same address.

JULY 3, 1888.

Appendix

Awi Hatts.			
Sewing, Brass Ferrule.....	\$3.50	gross	dis 45&10 %
Patent Sewing, Short.....	\$1.00	gross	dis 40&10 %
Patent Sewing, Long.....	\$1.90	gross	dis 40&10 %
Patent Peg, Plain Top.....	\$10.00	gross	dis 45&10 %
Patent Peg, Leather Top.....	\$12.00	gross	dis 45&10 %

Yves' Patent Door Bolt	dis 56 1/2
Wrought Barrel	dis 70 1/2
Wrought Square	dis 70 1/2
Wrt Shutter, all Iron, Stanley's list	dis 60 1/2
Wrt Shutter, Brass Knob, Stanley's	dis 40 1/2
Wrought Shutter, Sargent's list	dis 60 1/2
Wrought Sunk Flush, Sargent's list	dis 55 1/2
Wrought Sunk Flush, Stanley's list	dis 50 1/2
Wrought S & G, Comm'n Stanley's list	dis 55 1/2

turska.....	7	dos \$2.50, dia 10 %
ardine Scissors.....	7	dos \$2.75 @ \$3.00 %
tar.....		7 dos \$3.75 %
prague, No. 1. 2 2	3	\$2.50.....dia 50 @ 10 @ 10 %

World's Best. # gross, No. 1, \$12.00; No. 2, \$24.00.
No. 3, \$30.00.....dis 50&10
Universal.....dis 50&10
Domestic.....dis 50&10
Champion.....dis 50&10

Cards.
Horse and Carriage.....dis 10 @ 10&10
Cotton.....New list, Aug., 1888, dis 10
Wool.....dis 10

Carpet Stretchers.
Cast Steel, Polished.....dis 50&10
Cast Iron, Steel Points.....dis 50&10
Sockets.....dis 50&10
Bullard's.....dis 50 @ 50&10

Carpet Sweepers.
Bissell No. 5.....dis 17.00
Bissell No. 7 New Drop Pan.....dis 19.00
Bissell Grand.....dis 30.00
Grand Rapids.....dis 24.00
Crown Jewel.....No. 1, \$15; No. 2, \$10; dis 20
Magle.....dis 15.00
Jewel.....dis 17.00
Kystic.....dis 16.00
Cottage.....dis 18.00
Garland.....dis 18.00
Parlor Queen.....dis 24.00
Housewife's Delight.....dis 15.00
Queen.....dis 18.00
Queen, with band.....dis 18.00
King.....dis 20.00
Wood Improved.....dis 18.00
Hub.....dis 18.00
Cog Wheel.....dis 16.00

Cartridges.—See Ammunition.
Castors.
Bed.....New list:
Pike.....dis 55 @ 55&5
Shadow Socks.....dis 60 @ 60&5
Deep Socks.....dis 60 @ 60&5
Yale Casters, list May, 1884.....dis 60&10
Yale Gem.....dis 60&10
Martin's Patent (Phoenix).....dis 45&10 @ 50
Payson's Anti-friction.....dis 60 @ 60&10
"Giant" Truck Casters.....dis 10 @ 10&5
Stationary Truck Casters.....dis 45&10
Cattle Lamps.
Humason, Beckley & Co.'s.....dis 70
Burgess's.....dis 60&10
Hotchkiss.....dis 30
Peck Stow & W. Co.....dis 50&10

Chains.
Trace, 6-10-2, exact sizes, # pair, \$1.08 dis 50&10&5
Trace, 6-10-2, exact sizes, # pair, .92 @ 50&10&7&5
Trace, 7-10-2, exact sizes, # pair, 1.11 @ 50&10&7&5
Norz.—Traces, "Regular" sizes 3# net # pair less than exact.
Log, Fifth, Stretcher, and other fancy Chains, list Nov. 1, 1884.....dis 50&10 @ 50&10&5
American Coil 3-16 1/2 5-16 3/4 7-16 1/2 9-16 3/4 11-16 1/2 13-16 3/4 15-16 1/2 17-16 3/4 19-16 1/2 21-16 3/4 23-16 1/2 25-16 3/4 27-16 1/2 29-16 3/4 31-16 1/2 33-16 3/4 35-16 1/2 37-16 3/4 39-16 1/2 41-16 3/4 43-16 1/2 45-16 3/4 47-16 1/2 49-16 3/4 51-16 1/2 53-16 3/4 55-16 1/2 57-16 3/4 59-16 1/2 61-16 3/4 63-16 1/2 65-16 3/4 67-16 1/2 69-16 3/4 71-16 1/2 73-16 3/4 75-16 1/2 77-16 3/4 79-16 1/2 81-16 3/4 83-16 1/2 85-16 3/4 87-16 1/2 89-16 3/4 91-16 1/2 93-16 3/4 95-16 1/2 97-16 3/4 99-16 1/2 101-16 3/4 103-16 1/2 105-16 3/4 107-16 1/2 109-16 3/4 111-16 1/2 113-16 3/4 115-16 1/2 117-16 3/4 119-16 1/2 121-16 3/4 123-16 1/2 125-16 3/4 127-16 1/2 129-16 3/4 131-16 1/2 133-16 3/4 135-16 1/2 137-16 3/4 139-16 1/2 141-16 3/4 143-16 1/2 145-16 3/4 147-16 1/2 149-16 3/4 151-16 1/2 153-16 3/4 155-16 1/2 157-16 3/4 159-16 1/2 161-16 3/4 163-16 1/2 165-16 3/4 167-16 1/2 169-16 3/4 171-16 1/2 173-16 3/4 175-16 1/2 177-16 3/4 179-16 1/2 181-16 3/4 183-16 1/2 185-16 3/4 187-16 1/2 189-16 3/4 191-16 1/2 193-16 3/4 195-16 1/2 197-16 3/4 199-16 1/2 201-16 3/4 203-16 1/2 205-16 3/4 207-16 1/2 209-16 3/4 211-16 1/2 213-16 3/4 215-16 1/2 217-16 3/4 219-16 1/2 221-16 3/4 223-16 1/2 225-16 3/4 227-16 1/2 229-16 3/4 231-16 1/2 233-16 3/4 235-16 1/2 237-16 3/4 239-16 1/2 241-16 3/4 243-16 1/2 245-16 3/4 247-16 1/2 249-16 3/4 251-16 1/2 253-16 3/4 255-16 1/2 257-16 3/4 259-16 1/2 261-16 3/4 263-16 1/2 265-16 3/4 267-16 1/2 269-16 3/4 271-16 1/2 273-16 3/4 275-16 1/2 277-16 3/4 279-16 1/2 281-16 3/4 283-16 1/2 285-16 3/4 287-16 1/2 289-16 3/4 291-16 1/2 293-16 3/4 295-16 1/2 297-16 3/4 299-16 1/2 301-16 3/4 303-16 1/2 305-16 3/4 307-16 1/2 309-16 3/4 311-16 1/2 313-16 3/4 315-16 1/2 317-16 3/4 319-16 1/2 321-16 3/4 323-16 1/2 325-16 3/4 327-16 1/2 329-16 3/4 331-16 1/2 333-16 3/4 335-16 1/2 337-16 3/4 339-16 1/2 341-16 3/4 343-16 1/2 345-16 3/4 347-16 1/2 349-16 3/4 351-16 1/2 353-16 3/4 355-16 1/2 357-16 3/4 359-16 1/2 361-16 3/4 363-16 1/2 365-16 3/4 367-16 1/2 369-16 3/4 371-16 1/2 373-16 3/4 375-16 1/2 377-16 3/4 379-16 1/2 381-16 3/4 383-16 1/2 385-16 3/4 387-16 1/2 389-16 3/4 391-16 1/2 393-16 3/4 395-16 1/2 397-16 3/4 399-16 1/2 401-16 3/4 403-16 1/2 405-16 3/4 407-16 1/2 409-16 3/4 411-16 1/2 413-16 3/4 415-16 1/2 417-16 3/4 419-16 1/2 421-16 3/4 423-16 1/2 425-16 3/4 427-16 1/2 429-16 3/4 431-16 1/2 433-16 3/4 435-16 1/2 437-16 3/4 439-16 1/2 441-16 3/4 443-16 1/2 445-16 3/4 447-16 1/2 449-16 3/4 451-16 1/2 453-16 3/4 455-16 1/2 457-16 3/4 459-16 1/2 461-16 3/4 463-16 1/2 465-16 3/4 467-16 1/2 469-16 3/4 471-16 1/2 473-16 3/4 475-16 1/2 477-16 3/4 479-16 1/2 481-16 3/4 483-16 1/2 485-16 3/4 487-16 1/2 489-16 3/4 491-16 1/2 493-16 3/4 495-16 1/2 497-16 3/4 499-16 1/2 501-16 3/4 503-16 1/2 505-16 3/4 507-16 1/2 509-16 3/4 511-16 1/2 513-16 3/4 515-16 1/2 517-16 3/4 519-16 1/2 521-16 3/4 523-16 1/2 525-16 3/4 527-16 1/2 529-16 3/4 531-16 1/2 533-16 3/4 535-16 1/2 537-16 3/4 539-16 1/2 541-16 3/4 543-16 1/2 545-16 3/4 547-16 1/2 549-16 3/4 551-16 1/2 553-16 3/4 555-16 1/2 557-16 3/4 559-16 1/2 561-16 3/4 563-16 1/2 565-16 3/4 567-16 1/2 569-16 3/4 571-16 1/2 573-16 3/4 575-16 1/2 577-16 3/4 579-16 1/2 581-16 3/4 583-16 1/2 585-16 3/4 587-16 1/2 589-16 3/4 591-16 1/2 593-16 3/4 595-16 1/2 597-16 3/4 599-16 1/2 601-16 3/4 603-16 1/2 605-16 3/4 607-16 1/2 609-16 3/4 611-16 1/2 613-16 3/4 615-16 1/2 617-16 3/4 619-16 1/2 621-16 3/4 623-16 1/2 625-16 3/4 627-16 1/2 629-16 3/4 631-16 1/2 633-16 3/4 635-16 1/2 637-16 3/4 639-16 1/2 641-16 3/4 643-16 1/2 645-16 3/4 647-16 1/2 649-16 3/4 651-16 1/2 653-16 3/4 655-16 1/2 657-16 3/4 659-16 1/2 661-16 3/4 663-16 1/2 665-16 3/4 667-16 1/2 669-16 3/4 671-16 1/2 673-16 3/4 675-16 1/2 677-16 3/4 679-16 1/2 681-16 3/4 683-16 1/2 685-16 3/4 687-16 1/2 689-16 3/4 691-16 1/2 693-16 3/4 695-16 1/2 697-16 3/4 699-16 1/2 701-16 3/4 703-16 1/2 705-16 3/4 707-16 1/2 709-16 3/4 711-16 1/2 713-16 3/4 715-16 1/2 717-16 3/4 719-16 1/2 721-16 3/4 723-16 1/2 725-16 3/4 727-16 1/2 729-16 3/4 731-16 1/2 733-16 3/4 735-16 1/2 737-16 3/4 739-16 1/2 741-16 3/4 743-16 1/2 745-16 3/4 747-16 1/2 749-16 3/4 751-16 1/2 753-16 3/4 755-16 1/2 757-16 3/4 759-16 1/2 761-16 3/4 763-16 1/2 765-16 3/4 767-16 1/2 769-16 3/4 771-16 1/2 773-16 3/4 775-16 1/2 777-16 3/4 779-16 1/2 781-16 3/4 783-16 1/2 785-16 3/4 787-16 1/2 789-16 3/4 791-16 1/2 793-16 3/4 795-16 1/2 797-16 3/4 799-16 1/2 801-16 3/4 803-16 1/2 805-16 3/4 807-16 1/2 809-16 3/4 811-16 1/2 813-16 3/4 815-16 1/2 817-16 3/4 819-16 1/2 821-16 3/4 823-16 1/2 825-16 3/4 827-16 1/2 829-16 3/4 831-16 1/2 833-16 3/4 835-16 1/2 837-16 3/4 839-16 1/2 841-16 3/4 843-16 1/2 845-16 3/4 847-16 1/2 849-16 3/4 851-16 1/2 853-16 3/4 855-16 1/2 857-16 3/4 859-16 1/2 861-16 3/4 863-16 1/2 865-16 3/4 867-16 1/2 869-16 3/4 871-16 1/2 873-16 3/4 875-16 1/2 877-16 3/4 879-16 1/2 881-16 3/4 883-16 1/2 885-16 3/4 887-16 1/2 889-16 3/4 891-16 1/2 893-16 3/4 895-16 1/2 897-16 3/4 899-16 1/2 901-16 3/4 903-16 1/2 905-16 3/4 907-16 1/2 909-16 3/4 911-16 1/2 913-16 3/4 915-16 1/2 917-16 3/4 919-16 1/2 921-16 3/4 923-16 1/2 925-16 3/4 927-16 1/2 929-16 3/4 931-16 1/2 933-16 3/4 935-16 1/2 937-16 3/4 939-16 1/2 941-16 3/4 943-16 1/2 945-16 3/4 947-16 1/2 949-16 3/4 951-16 1/2 953-16 3/4 955-16 1/2 957-16 3/4 959-16 1/2 961-16 3/4 963-16 1/2 965-16 3/4 967-16 1/2 969-16 3/4 971-16 1/2 973-16 3/4 975-16 1/2 977-16 3/4 979-16 1/2 981-16 3/4 983-16 1/2 985-16 3/4 987-16 1/2 989-16 3/4 991-16 1/2 993-16 3/4 995-16 1/2 997-16 3/4 999-16 1/2 1001-16 3/4 1003-16 1/2 1005-16 3/4 1007-16 1/2 1009-16 3/4 1011-16 1/2 1013-16 3/4 1015-16 1/2 1017-16 3/4 1019-16 1/2 1021-16 3/4 1023-16 1/2 1025-16 3/4 1027-16 1/2 1029-16 3/4 1031-16 1/2 1033-16 3/4 1035-16 1/2 1037-16 3/4 1039-16 1/2 1041-16 3/4 1043-16 1/2 1045-16 3/4 1047-16 1/2 1049-16 3/4 1051-16 1/2 1053-16 3/4 1055-16 1/2 1057-16 3/4 1059-16 1/2 1061-16 3/4 1063-16 1/2 1065-16 3/4 1067-16 1/2 1069-16 3/4 1071-16 1/2 1073-16 3/4 1075-16 1/2 1077-16 3/4 1079-16 1/2 1081-16 3/4 1083-16 1/2 1085-16 3/4 1087-16 1/2 1089-16 3/4 1091-16 1/2 1093-16 3/4 1095-16 1/2 1097-16 3/4 1099-16 1/2 1101-16 3/4 1103-16 1/2 1105-16 3/4 1107-16 1/2 1109-16 3/4 1111-16 1/2 1113-16 3/4 1115-16 1/2 1117-16 3/4 1119-16 1/2 1121-16 3/4 1123-16 1/2 1125-16 3/4 1127-16 1/2 1129-16 3/4 1131-16 1/2 1133-16 3/4 1135-16 1/2 1137-16 3/4 1139-16 1/2 1141-16 3/4 1143-16 1/2 1145-16 3/4 1147-16 1/2 1149-16 3/4 1151-16 1/2 1153-16 3/4 1155-16 1/2 1157-16 3/4 1159-16 1/2 1161-16 3/4 1163-16 1/2 1165-16 3/4 1167-16 1/2 1169-16 3/4 1171-16 1/2 1173-16 3/4 1175-16 1/2 1177-16 3/4 1179-16 1/2 1181-16 3/4 1183-16 1/2 1185-16 3/4 1187-16 1/2 1189-16 3/4 1191-16 1/2 1193-16 3/4 1195-16 1/2 1197-16 3/4 1199-16 1/2 1201-16 3/4 1203-16 1/2 1205-16 3/4 1207-16 1/2 1209-16 3/4 1211-16 1/2 1213-16 3/4 1215-16 1/2 1217-16 3/4 1219-16 1/2 1221-16 3/4 1223-16 1/2 1225-16 3/4 1227-16 1/2 1229-16 3/4 1231-16 1/2 1233-16 3/4 1235-16 1/2 1237-16 3/4 1239-16 1/2 1241-16 3/4 1243-16 1/2 1245-16 3/4 1247-16 1/2 1249-16 3/4 1251-16 1/2 1253-16 3/4 1255-16 1/2 1257-16 3/4 1259-16 1/2 1261-16 3/4 1263-16 1/2 1265-16 3/4 1267-16 1/2 1269-16 3/4 1271-16 1/2 1273-16 3/4 1275-16 1/2 1277-16 3/4 1279-16 1/2 1281-16 3/4 1283-16 1/2 1285-16 3/4 1287-16 1/2 1289-16 3/4 1291-16 1/2 1293-16 3/4 1295-16 1/2 1297-16 3/4 1299-16 1/2 1301-16 3/4 1303-16 1/2 1305-16 3/4 1307-16 1/2 1309-16 3/4 1311-16 1/2 1313-16 3/4 1315-16 1/2 1317-16 3/4 1319-16 1/2 1321-16 3/4 1323-16 1/2 1325-16 3/4 1327-16 1/2 1329-16 3/4 1331-16 1/2 1333-16 3/4 1335-16 1/2 1337-16 3/4 1339-16 1/2 1341-16 3/4 1343-16 1/2 1345-16 3/4 1347-16 1/2 1349-16 3/4 1351-16 1/2 1353-16 3/4 1355-16 1/2 1357-16 3/4 1359-16 1/2 1361-16 3/4 1363-16 1/2 1365-16 3/4 1367-16 1/2 1369-16 3/4 1371-16 1/2 1373-16 3/4 1375-16 1/2 1377-16 3/4 1379-16 1/2 1381-16 3/4 1383-16 1/2 1385-16 3/4 1387-16 1/2 1389-16 3/4 1391-16 1/2 1393-16 3/4 1395-16 1/2 1397-16 3/4 1399-16 1/2 1401-16 3/4 1403-16 1/2 1405-16 3/4 1407-16 1/2 1409-16 3/4 1411-16 1/2 1413-16 3/4 1415-16 1/2 1417-16 3/4 1419-16 1/2 1421-16 3/4 1423-16 1/2 1425-16 3/4 1427-16 1/2 1429-16 3/4 1431-16 1/2 1433-16 3/4 1435-16 1/2 1437-16 3/4 1439-16 1/2 1441-16 3/4 1443-16 1/2 1445-16 3/4 1447-16 1/2 1449-16 3/4 1451-16 1/2 1453-16 3/4 1455-16 1/2 1457-16 3/4 1459-16 1/2 1461-16 3/4 1463-16 1/2 1465-16 3/4 1467-16 1/2 1469-16 3/4 1471-16 1/2 1473-16 3/4 1475-16 1/2 1477-16 3/4 1479-16 1/2 1481-16 3/4 1483-16 1/2 1485-16 3/4 1487-16 1/2 1489-16 3/4 1491-16 1/2 1493-16 3/4 1495-16 1/2 1497-16 3/4 1499-16 1/2 1501-16 3/4 1503-16 1/2 1505-16 3/4 1507-16 1/2 1509-16 3/4 1511-16 1/2 1513-16 3/4 1515-16 1/2 1517-16 3/4 1519-16 1/2 1521-16 3/4 1523-16 1/2 1525-16 3/4 1527-16 1/2 1529-16 3/4 1531-16 1/2 1533-16 3/4 1535-16 1/2 1537-16 3/4 1539-16 1/2 1541-16 3/4 1543-16 1/2 1545-16 3/4 1547-16 1/2 1549-16 3/4 1551-16 1/2 1553-16 3/4 1555-16 1/2 1557-16 3/4 1559-16 1/2 1561-16 3/4 1563-16 1/2 1565-16 3/4 1567-16 1/2 1569-16 3/4 1571-16 1/2 1573-16 3/4 1575-16 1/2 1577-16 3/4 1579-16 1/2 1581-16 3/4 1583-16 1/2 1585-16 3/4 1587-16 1/2 1589-16 3/4 1591-16 1/2 1593-16 3/4 1595-16 1/2 1597-16 3/4 1599-16 1/2 1601-16 3/4 1603-16 1/2 1605-16 3/4 1607-16 1/2 1609-16 3/4 1611-16 1/2 1613-16 3/4 1615-16 1/2 1617-16 3/4 1619-16 1/2 1621-16 3/4 1623-16 1/2 1625-16 3/4 1627-16 1/2 1629-16 3/4 1631-16 1/2 1633-16 3/4 1635-16 1/2 1637-16 3/4 1639-16 1/2 1641-16 3/4 1643-16 1/2 1645-16 3/4 1647-16 1/2 1649-16 3/4 1651-16 1/2 1653-16 3/4 1655-16 1/2 1657-16 3/4 1659-16 1/2 1661-16 3/4 1663-16 1/2 1665-16 3/4 1667-16 1/2 1669-16 3/4 1671-16 1/2 1673-16 3/4 1675-16 1/2 1677-16 3/4 1679-16 1/2 1681-16 3/4 1683-16 1/2 1685-16 3/4 1687-16 1/2 1689-16 3/4 1691-16 1/2 1693-16 3/4 1695-16 1/2 1697-16 3/4 1699-16 1/2 1701-16 3/4 1703-16 1/2 1705-16 3/4 1707-16 1/2 1709-16 3/4 1711-16 1/2 1713-16 3/4 1715-16 1/2 1717-16 3/4 1719-16 1/2 1721-16 3/4 1723-16 1/2 1725-16 3/4 1727-16 1/2 1729-16 3/4 1731-16 1/2 1733-16 3/4 1735-16 1/2 1737-16 3/4 1739-16 1/2 1741-16 3/4 1743-16 1/2 1745-16 3/4 1747-16 1/2 1749-16 3/4 1751-16 1/2 1753-16 3/4 1755-16 1/2 1757-16 3/4 1759-16 1/2 1761-16 3/4 1763-16 1/2 1765-16 3/4 1767-16 1/2 1769-16 3/4 1771-16 1/2 1773-16 3/4 1775-16 1/2 1777-16 3/4 1779-16 1/2 1781-16 3/4 1783-16 1/2 1785-16 3/4 1787-16 1/2 1789-16 3/4 1791-16 1/2 1793-16 3/4 1795-16 1/2 1797-16 3/4 1799-16 1/2 1801-16 3/4 1803-16 1/2 1805-16 3/4 1807-16 1/2 1809-16 3/4 1811-16 1/2 1813-16 3/4 1815-16 1/2 1817-16 3/4 1819-16 1/2 1821-16 3/4 1823-16 1/2 1825-16 3/4 1827-16 1/2 1829-16 3/4 1831-16 1/2 1833-16 3/4 1835-16 1/2 1837-16 3/4 1839-16 1/2 1841-16 3/4 1843-16 1/2 1845-16 3/4 1847-16 1/2 1849-16 3/4 1851-16 1/2 1853-16 3/4 1855-16 1/2 1857-16 3/4 1859-16 1/2 1861-16 3/4 1863-16 1/2 1865-16 3/4 1867-16 1/2 1869-16 3/4 1871-16 1/2 1873-16 3/4 1875-16 1/2 1877-16 3/4 1879-16 1/2 1881-16 3/4 1883-16 1/2 1885-16 3/4 1887-16 1/2 1889-16 3/4 1891-16 1/2 1893-16 3/4 1895-16 1/2 1897-16 3/4 1899-16 1/2 1901-16 3/4 1903-16 1/2 1905-16 3/4 1907-16 1/2 1909-16 3/4 1911-16 1/2 1913-16 3/4 1915-16 1/2 1917-16 3/4 1919-16 1/2 1921-16 3/4 1923-16 1/2 1925-16 3/4 1927-16 1/2 1929-16 3/4 1931-16 1/2 1933-16 3/4 1935-16 1/2 1937-16 3/4 1939-16 1/2 1941-16 3/4 1943-16 1/2 1945-16 3/4 1947-16 1/2 1949-16 3/4 1951-16 1/2 1953-16 3/4 19

Champion Rings..... $\frac{1}{2}$ doz \$2.00
Champion Rings, Double..... $\frac{1}{2}$ doz \$2.25
Brown's Rings..... $\frac{1}{2}$ doz \$2.00
Brown's Rings..... $\frac{1}{2}$ doz \$1.25 @ 1.30

Hoisting Apparatus.
"Moore's" Hand Hoist, with Lock Brake..... $\frac{1}{2}$ doz 70¢
"Moore's" Differential Pulley Block..... $\frac{1}{2}$ doz 40¢

Holders, File and Tool.
Rais Pat..... $\frac{1}{2}$ doz \$4; $\frac{1}{2}$ doz 25¢
Nicholson File Holders..... $\frac{1}{2}$ doz 20¢

Hollow-Ware.
Iron—
Stove Hollow-Ware, Ground..... $\frac{1}{2}$ doz 60¢10¢60¢10¢65¢
Stove Hollow-Ware, Unground..... $\frac{1}{2}$ doz 70¢8¢70¢10¢
Enameled and Tinned Hollow-Ware..... $\frac{1}{2}$ doz 70¢ @ 70¢15¢
Oval Boilers, Gascones, Blue Pots..... $\frac{1}{2}$ doz 40¢5¢ @ 40¢10¢
Gray Enameled Ware..... $\frac{1}{2}$ doz 10¢ @ 40¢15¢
Agate and Granite Ware..... $\frac{1}{2}$ doz 25¢
Rustless Hollow-Ware..... $\frac{1}{2}$ doz 50¢ @ 50¢15¢
Galvanised Tea-Kettles—
Each..... $\frac{1}{2}$ doz 55¢ 60¢ 75¢
Stiver Plated—4 mo. or 5 $\frac{1}{2}$ mo. in 30 days..... $\frac{1}{2}$ doz 40¢25¢

Reed & Barton..... $\frac{1}{2}$ doz 40¢25¢
Meriden Britannia Co..... $\frac{1}{2}$ doz 40¢25¢
Simpeon, Hall, Miller & Co..... $\frac{1}{2}$ doz 40¢25¢
Rogers & Brother..... $\frac{1}{2}$ doz 40¢25¢
Hartford Silver Plate Co..... $\frac{1}{2}$ doz 40¢25¢15¢
William Rogers Mfg. Co..... $\frac{1}{2}$ doz 40¢25¢15¢

Hoeks.
Cast Iron—
Bird Cage, Sargent's list..... $\frac{1}{2}$ doz 40¢10¢10¢10¢
Bird Cage, Reading..... $\frac{1}{2}$ doz 60¢10¢10¢10¢
Sargent's Patent..... $\frac{1}{2}$ doz 60¢10¢10¢10¢
Clothes Line, Reading list..... $\frac{1}{2}$ doz 60¢10¢ @ 60¢10¢10¢
Colling, Sargent's list..... $\frac{1}{2}$ doz 55¢10¢ @ 55¢10¢10¢
Harness, Reading list..... $\frac{1}{2}$ doz 55¢10¢ @ 55¢10¢10¢
Coat and Hat, Sargent's list..... $\frac{1}{2}$ doz 55¢10¢ @ 55¢10¢10¢
Coat and Hat, Reading..... $\frac{1}{2}$ doz 50¢10¢ @ 50¢10¢10¢

Wrought Iron—
Cotton..... $\frac{1}{2}$ doz \$1.25
Cotton Pat. N. Y. Mallet & Handle Wks..... $\frac{1}{2}$ doz 80¢
Tie Rod and Picture (C. & Mfg. Co.)..... $\frac{1}{2}$ doz 50¢
Wrought Staples, Hooks, &c.....See Wrought Staples
Bench Hooks.....See Bench Hooks

Wire—
Wire Coat and Hat, Gem, list April, 1886..... $\frac{1}{2}$ doz 45¢
Wire Coat and Hat, Miles', list April, 1886..... $\frac{1}{2}$ doz 45¢
Indestructible Coat and Hat..... $\frac{1}{2}$ doz 45¢
Wire Coat and Hat, Standard..... $\frac{1}{2}$ doz 45¢
Belt..... $\frac{1}{2}$ doz 75¢10¢ @ 80¢
Grass..... $\frac{1}{2}$ doz \$2.00
Embroidered Patent..... $\frac{1}{2}$ doz 55¢ @ 60¢
Hooks and Eyes—Malleable iron..... $\frac{1}{2}$ doz 70¢ @ 70¢10¢
Hooks and Eyes—Brass..... $\frac{1}{2}$ doz 60¢10¢10¢
Fish Hooks, American..... $\frac{1}{2}$ doz 50¢

Horse Nails.
Nos. 6 7 8 9 10
Ausable..... $\frac{1}{2}$ doz 25¢ 30¢ 35¢ 40¢ 45¢
Clinton, Vin..... $\frac{1}{2}$ doz 25¢ 30¢ 35¢ 40¢ 45¢
Baxer..... $\frac{1}{2}$ doz 25¢ 30¢ 35¢ 40¢ 45¢
Lyra..... $\frac{1}{2}$ doz 25¢ 30¢ 35¢ 40¢ 45¢
Snowden..... $\frac{1}{2}$ doz 25¢ 30¢ 35¢ 40¢ 45¢
Putnam..... $\frac{1}{2}$ doz 25¢ 30¢ 35¢ 40¢ 45¢
Vulcan..... $\frac{1}{2}$ doz 25¢ 30¢ 35¢ 40¢ 45¢
Crown..... $\frac{1}{2}$ doz 25¢ 30¢ 35¢ 40¢ 45¢
Globe..... $\frac{1}{2}$ doz 25¢ 30¢ 35¢ 40¢ 45¢
A. C..... $\frac{1}{2}$ doz 25¢ 30¢ 35¢ 40¢ 45¢
C. B. K..... $\frac{1}{2}$ doz 25¢ 30¢ 35¢ 40¢ 45¢
Champion..... $\frac{1}{2}$ doz 25¢ 30¢ 35¢ 40¢ 45¢
New Haven..... $\frac{1}{2}$ doz 25¢ 30¢ 35¢ 40¢ 45¢
Saranac..... $\frac{1}{2}$ doz 25¢ 30¢ 35¢ 40¢ 45¢
Champion..... $\frac{1}{2}$ doz 25¢ 30¢ 35¢ 40¢ 45¢
Star..... $\frac{1}{2}$ doz 25¢ 30¢ 35¢ 40¢ 45¢
Anchor..... $\frac{1}{2}$ doz 25¢ 30¢ 35¢ 40¢ 45¢
Western..... $\frac{1}{2}$ doz 25¢ 30¢ 35¢ 40¢ 45¢
Empire Bronzed..... $\frac{1}{2}$ doz 25¢ 30¢ 35¢ 40¢ 45¢

Horse Shoes.—See Shoes, Horse.

Hoese. Rubber, competition......75¢10¢ @ 80¢
Standard..... $\frac{1}{2}$ doz 70¢7¢ @ 80¢
Extra..... $\frac{1}{2}$ doz 70¢7¢ @ 80¢
W. Y. B. & P. Co., Para..... $\frac{1}{2}$ doz 70¢7¢ @ 80¢
W. Y. B. & P. Co., Extra..... $\frac{1}{2}$ doz 70¢7¢ @ 80¢
W. Y. B. & P. Co., Dundee..... $\frac{1}{2}$ doz 70¢7¢ @ 80¢

Ice Picks, Chisels, &c.
Am. Ice Chisel Pol'd..... $\frac{1}{2}$ doz \$3.00, $\frac{1}{2}$ doz 20¢25¢
National Ice Chisels..... $\frac{1}{2}$ doz \$2.25, $\frac{1}{2}$ doz 20¢
Novaya Ice Breakers..... $\frac{1}{2}$ doz \$2.25, $\frac{1}{2}$ doz 20¢
Dunlap's Ring Picks..... $\frac{1}{2}$ doz \$2.00, $\frac{1}{2}$ doz 15¢
Sargent's..... $\frac{1}{2}$ doz \$1.50, $\frac{1}{2}$ doz 10¢
Iron Head Picks, Sargent's..... $\frac{1}{2}$ doz \$1.25, $\frac{1}{2}$ doz 10¢
Ice Mallets, Pick in handle..... $\frac{1}{2}$ doz \$2.00, $\frac{1}{2}$ doz 15¢
Ice Axes, Small Coat or Mail..... $\frac{1}{2}$ doz \$1.25, $\frac{1}{2}$ doz 20¢10¢
Combination Ice Tools..... $\frac{1}{2}$ doz \$2.00 net
Acme Ice Pick and Tongue..... $\frac{1}{2}$ gross \$55.00, $\frac{1}{2}$ doz 50¢10¢
Roger's Lightning Ice Chisel..... $\frac{1}{2}$ gross \$28.50

Ice Tongs.
Champion, S. S. & Co..... $\frac{1}{2}$ doz \$4.00, $\frac{1}{2}$ doz 25¢10¢
Family..... $\frac{1}{2}$ doz \$2.75, $\frac{1}{2}$ doz 20¢25¢

Jack Screws.—See Screws.

Kettles.
Bigger 7 to 17 in.....Spun. Stamped.
Brass 7 to 17 in..... $\frac{1}{2}$ doz 25¢
Enameled and Tea Kettles.....See Hollow-Ware

Keys.
Lock Aco's list Dec. 30, 1886..... $\frac{1}{2}$ doz 50¢10¢ @ 60¢25¢
Legg Co's, Truck and Padlock..... $\frac{1}{2}$ doz 25¢25¢
Hotchkiss' Brass Blanks..... $\frac{1}{2}$ doz 40¢
Hotchkiss' Copper and Tinned..... $\frac{1}{2}$ doz 40¢
Hotchkiss' Padlock and Cabinet..... $\frac{1}{2}$ doz 35¢
Batchet Bed Keys..... $\frac{1}{2}$ doz \$4.00, $\frac{1}{2}$ doz 15¢

Knife Sharpeners.
Parkin's Applewood Handles..... $\frac{1}{2}$ doz \$2.00, $\frac{1}{2}$ doz 40¢
Parkin's Rosewood or Cocobolo..... $\frac{1}{2}$ doz \$2.00, $\frac{1}{2}$ doz 40¢

Knives.
Wilson's Butcher Knives..... $\frac{1}{2}$ doz 50¢ @ 25¢
Ames' Butcher Knives..... $\frac{1}{2}$ doz 40¢15¢
Nichols' Butcher Knives..... $\frac{1}{2}$ doz 40¢15¢
Ames' Shoe Knives..... $\frac{1}{2}$ doz 50¢25¢
Ames' Bread Knives..... $\frac{1}{2}$ doz \$1.50, $\frac{1}{2}$ doz 15¢ @ 20¢
Moran's Shoe and Bread Knives..... $\frac{1}{2}$ doz 20¢
Hay and Straw.....See Hay Knives
Table and Pocket.....See Cutlery

Knobs.
Door Mineral.....50¢65¢
Door Por. Jar'd.....75¢75¢
Door Por. Fox Nickel.....\$2.00 @ 2.25
Door Por. Richs Nickel.....\$2.00 @ 2.25
Door Por. Porcelain..... $\frac{1}{2}$ doz \$4.0010¢60¢10¢15¢
Hemacite Door Knob, new list..... $\frac{1}{2}$ doz 40¢10¢10¢
Yale & Towne Wood Knobs, list Dec., 1885..... $\frac{1}{2}$ doz 40¢
Furniture Plain.....75¢ gross inch, $\frac{1}{2}$ doz 10¢
Furniture, Wood Screws..... $\frac{1}{2}$ doz 25¢10¢
Base, Rubber Tip..... $\frac{1}{2}$ doz 70¢10¢25¢
Picture, Judd's..... $\frac{1}{2}$ doz 60¢10¢10¢ @ 70¢
Picture, Hemacite..... $\frac{1}{2}$

Adelphi.
L. Melting, Sargent's......dis 55-10 1/2
 Melting, Reading.....dis 55-10 1/2
 Melting, Monroe's Patent.....dis 54.00, dis 40 1/2
 Melting, P. S. & W.....dis 55-10 @ 40 1/2
 Melting, Warner's.....dis 55-10 @ 40 1/2

Lawn Mowers.
 Standard List.....dis 50-10 1/2
 Enterprise.....dis 60-10 1/2

Lanterns.
 Rubular, Lamp with Guards.....dis 44.00 @ \$4.35
 Rubular, Lift Wire, with Guards.....dis 44.00 @ \$4.75
 Rubular, Square Plain with Guards.....dis \$4.30 @ \$4.35
 Rubular, Sq Lift Wire with Guards.....dis \$4.50 @ \$4.75
 Without Guards, 25¢ a dozen less.

Police, small, \$5.00; Med. \$7.25; Large, \$9.75. dis 30-25 1/2

Lemon Squeezers.

Porcelain Lined, No. 1.....dis 30.00, dis 35-20 1/2
 Wood, No. 3.....dis 30.00, dis 35 1/2
 Wood, Common.....dis \$1.70 @ 1.75
 Dunlap's Improved.....dis \$3.75, dis \$9 1/2
 Sammis.....No. 1, \$5; 2, \$9; 12, \$18 dis 25-10 1/2
 Samsis' "Star".....dis \$5.50
 The "Boss".....dis \$2.50
 Dean's.....No. 1, dis \$5.50; 2, \$3.25; 3, \$1.10
 Little Giant.....dis 50 @ 50-25 1/2
 King.....dis 40-25 1/2

Lines.
 Cotton and Linen Fish, Draper's.....dis 60 1/2
 Draper's Chalk.....dis 60 1/2
 Draper's Mason's Linen, 34 ft., No. 1, \$1.25 No. 2, \$1.75 No. 3, \$2.25 No. 4, \$2.75 No. 5, \$3.25. dis 25 1/2
 Cotton Chalk.....dis 55 1/2
 Jamison, Cotton, No. 4, \$3; No. 4 1/2, \$2.50.....dis 10 1/2
 Sibley, Cotton, Braided, No. 0, \$5.00 No. 1, \$5.50; No. 2, \$7.00; No. 3, \$7.50 gross.....dis 25 1/2
 Mason's Linen, No. 3 1/2, \$1.50; No. 4, \$3; No. 4 1/2, \$3.50
 Mason's Colored Cotton.....dis 45
 Wire Clothes, No. 18, \$3.60; No. 19, \$3.00; No. 20, \$2.50
 Ventilator Cord, Jamison Braided, White or Drab
 Cotton.....\$7.50 dis 20 1/2

Locks, Padlocks, Cabinet Locks, &c.
Door Locks, Latches, &c.
 List, Dec. 30, '86, chd Feb. 3, '87.....dis 50-10 @ 60-25 1/2
 Note.—Lower no. prices often made.

Sargent & Co. (list Feb. 1, 1888).....dis 50-10-25 1/2
 Reading Hardware Co. (list Feb. 3, 1881, dis 50-60-10 1/2
 Livingston & Co.....dis 70 1/2
 Perkins' Burglar Proof.....dis 60-25 1/2
 Yale.....dis 50-10 1/2
 F. M. "Extension Cylinder".....dis 15-50 @ 40 1/2
 Barnes Mfg. Co.....dis 40 1/2
 Yale Corrugated Key.....dis 35 1/2
 Dietz Flat Key.....dis 30 1/2
 L. & O. Round Key Latches.....dis 30-10 1/2
 L. & O. Flat Key Latches.....dis 30-10 1/2
 Romer's Night Latches.....dis 15 1/2
 "Shepherdson" or "U. S.".....dis 15 1/2
 "Felter" or "American".....dis 40-10 1/2
 Seed's N. Y. Hasp Lock.....dis 25 1/2

Cabinets.
 Eagle, Gaylord Parker and } List March, '76, revised
 Corbin.....} Jan. 1, '84, dis 33-10 1/2
 Delta, No. 35 to 50.....dis 40 1/2
 Delta, No. 51 to 63.....dis 40 1/2
 Delta, No. 64 to 96.....dis 30 1/2
 Stoddard Lock Co.....dis 30 @ 35 1/2
 Champion's Night Latches.....dis 40 1/2
 Barnes Mfg. Co.....dis 40 1/2
 Eagle and Corbin Trunk.....dis 50-25 1/2
 "Champion" Cabinet and Combination.....dis 35 1/2
 Yale.....dis 35 1/2
 Romer's.....dis 25 1/2

Padlocks.
 List, Dec. 23, '84.....dis 65-10-25 1/2
 Yale Lock Mfg. Co. s.....dis \$24 1/2
 Eagle.....dis 50-25 1/2
 Eureka, Eagle Lock Co.....dis 40-25 1/2
 Romer's No. 0-1.....dis 15 1/2
 Romer's Scandinavian, &c. No. 100 to 500.....dis 15 1/2
 A. K. Diets.....dis 40 1/2
 "Champion" Padlocks.....dis 40 1/2
 Hotchkiss.....dis 30 1/2
 "Star".....dis 45 1/2
 "Horse Shoe" dis 40 1/2
 Barnes Mfg. Co.....dis 40 1/2
 Romer's Patent.....dis 30 1/2
 Brown's Padlocks.....dis 25 1/2
 Scandinavian.....dis 20 1/2
 Fraim's Pat. Scandinavian new list (new).....dis 60 1/2

Lumber Tools.
 Ring Peavies, "Blue Line" Finish.....dis 20.00
 Ring Peavies, Common Finish.....dis 18.00
 Steel Socket Peavies.....dis 23.00
 Mail Iron Socket Peavies.....dis 19.00
 Cant Hooks, "Blue Line" Finish.....dis 14.00
 Cant Hooks, Common Finish.....dis 14.00
 Cant Hooks, Mail, Socket Clasp, "Blue Line" Finish.....dis 16.00
 Cant Hooks, Mail, Socket Clasp, Common Finish.....dis 14.50
 Cant Hooks, Clip Clasp, "Blue Line" Fin.....dis 14.50
 Cant Hooks, Clip Clasp, Common Finish.....dis 12.00
 Hand Spikes.....dis 6 ft., \$15.00; 8 ft., \$20.00
 Pike Poles, Pike & Hook, 12 ft., 14 ft., 16 ft., 18 ft., 20 ft.,
 22 ft., \$11.50 12.50 14.50 16.50 17.50 19.50
 Pike Poles, Pike only, 10 11 12 13 14 15 16 17 18 19 20
 dis 6.00 7.00 8.00 9.00 10.00 11.00
 dis 14.00 15.00 17.00
 Setting Poles, 10 11 12 13 14 15 16 17 18 19 20
 dis 12.50
 Winding Hooks.....dis 12.50
 Binding Hooks.....dis 12.50
 Binding Rings.....dis 12.50
 Log Binders.....dis 22.00
 Standard Boot Calks, 1 to 5 M., dis 25 1/2; 5 to 10 M., dis 30 1/2
 Square Steel Boot Calks.....dis 40 1/2
 Chain Rattling Dogs.....dis 10 @ 12.50
 Ring Rattling Dogs.....dis 100, med., \$12.50; large, \$15.00
 Timber Grapples.....dis 150.00

Lustre.
 Four-ounce Bottles.....dis \$1.75 dis gro. \$17.00

Mallets.
 H. Hickory.....dis 30-10 @ 30-15 1/2
 "Ironvulcan".....dis 30-10 @ 30-15 1/2
 B. & L. Lock Co., Hickory and L. V.....dis 30 @ 30-10 1/2

Match Safes.
 Dangersfield's Self-igniting.....dis \$1.50
 Mattocks.—Regular list.....dis 60-25 @ 60-10 1/2

Meat Cutters.
 Dixon's—Nos. 1 2 3 4
 dis \$14.00 17.00 19.00 30.00 dis 45 1/2
 Woodruff's.....No. 100 150
 dis \$10.00 15.00 dis 45 1/2
 Champion.....No. 300 500
 dis \$22.00 27.00 40.00 dis 45 1/2
 Hales' Pattern No. 11 12 13
 dis \$27.00 33.00 45.00 dis 70 1/2
 American.....dis 45 1/2
 No. 1.....dis 50.00 7.00 10.00 25.00 50.00 60.00
 Enterprise.....dis 30 1/2
 No. 1.....dis 10 11 12 13 14 15 16 17 18 19 20
 dis 2.50 3.50 4.50 5.50 6.50 7.50 8.50 9.50 10.50 11.50 12.50 13.50 14.50 15.50 16.50 17.50 18.50 19.50 20.50

Cable Laid Italian "..... ¢ lb 22 $\frac{1}{2}$ @ 150
India Cable Laid "..... ¢ lb 180
Silver Lake, A Quality, White.....50c dis 10@102 $\frac{1}{2}$ c
Silver Lake, A Quality, Drab.....50c dis 10@102 $\frac{1}{2}$ c
Silver Lake, B Quality, White.....50c dis 10@102 $\frac{1}{2}$ c
Silver Lake, B Quality, Drab.....50c dis 10@102 $\frac{1}{2}$ c
Silver Lake, C Quality, White Only.....77c @ 35 $\frac{1}{2}$
Sylvan Spring, Extra Braided, White.....31c
Sylvan Spring, Extra Braided, Drab.....30c
Semper Idem, Braided, White.....30c
Krypton, India Hemp, Braided.....25c
Samson, Braided, White Cotton.....60c dis 30 @ 302 $\frac{1}{2}$ c
Samson, Braided, Drab Cotton.....55c dis 30 @ 302 $\frac{1}{2}$ c
Samson, Braided Italian Hemp.....55c dis 30 @ 302 $\frac{1}{2}$ c
Samson Braided Linen.....50c dis 30 @ 302 $\frac{1}{2}$ c

Sash Locks.
Clark's No. 1, \$1.00; No. 2, 90c $\text{\$}$ gross.....dis 33 $\frac{1}{2}$ c
Ferguson's ".....dis 33 $\frac{1}{2}$ c
Morris and Tripp, List Aug. 16, 1886.....dis 60c $\frac{1}{2}$ c
Victor.....60c $\frac{1}{2}$ c
Walker's.....dis 10 c
Attwell Mfg. Co.....dis 25 @ 33 $\frac{1}{2}$ c
Hammond's Window Sashes.....dis 60 $\frac{1}{2}$ c
Common Sense, Jap d. Cop'd & Br'nd..... $\text{\$}$ gross 110
Universal.....dis 30 c
Kempshall's Gravity.....dis 60 c
Kempshall's Model.....dis 60 $\frac{1}{2}$ c
Strubin, Braided, Drab Cotton.....55c dis 30 @ 302 $\frac{1}{2}$ c
Payson's Perfect.....dis 30 @ 50 $\frac{1}{2}$ c
Hugulin's New and Improved Adjustable Sash Balances, list Jan. 5, 1887.....dis 25c $\frac{1}{2}$ c
Hugulin's New Sash Locks, list Jan. 5, 87, dis 25c $\frac{1}{2}$ c
Stoddard's Practical.....dis 10 c
Dee Patent Tool & Mill Co., No. 108, \$1.10, dis 60 c
Davis, Bronze, Barnes Wfg. Co.....dis 50 c
Champion Safety, List March 1, 1888.....dis 50c $\frac{1}{2}$ c

Sash Weights.
Solid Eyes..... $\text{\$}$ ton 335

Sausage Stuffers or Fillers.
Curry " Challenge "..... $\text{\$}$ doz 350, dis 50c $\frac{1}{2}$ c
" " "..... $\text{\$}$ doz. No. 1, 515; No. 2, 511, dis 50c $\frac{1}{2}$ c
Enterprise Mfg. Co.....dis 50 $\frac{1}{2}$ c
" " ".....dis 40 $\frac{1}{2}$ c

Saws.
Dixton's Circular.....dis 45@45 $\frac{1}{2}$ c } Extras some-
Dixton's Cross Cut, 5 & 6 ft. } times given by
Dixton's Hand.....dis 25@25 $\frac{1}{2}$ c } jobbers
Atkins' Circular.....dis 50 c
Atkins' Silver Steel Diamond X Cuts..... $\text{\$}$ foot 70 $\frac{1}{2}$ c
Atkins' Special Steel Dexter X Cuts..... $\text{\$}$ foot 70 $\frac{1}{2}$ c
Atkins' Special Steel Diamond X Cuts..... $\text{\$}$ foot 80 c
Atkins' Champion and Electric Tooth X Cuts..... $\text{\$}$ foot 27 @ 23 $\frac{1}{2}$ c
Atkins' Hollow Back X Cuts..... $\text{\$}$ foot 18 $\frac{1}{2}$ c
Atkins' Shingle, Mulax, Drag, &c.....dis 45 c
W. M. & C., Hand.....dis 50 $\frac{1}{2}$ c @ 30 $\frac{1}{2}$ c
W. M. & C. Champion X Cuts, Regular X cut, 24 in..... $\text{\$}$ foot 27 $\frac{1}{2}$ c
W. M. & C. X Cuts, Thin Back..... $\text{\$}$ foot 27 $\frac{1}{2}$ c
Hobbs, Hobbins, and Mill.....dis 50 $\frac{1}{2}$ c
Peace Hand Panel and Rip.....dis 50 $\frac{1}{2}$ c @ 30 $\frac{1}{2}$ c
Peace Cross Cut, Standard..... $\text{\$}$ foot 25 $\frac{1}{2}$ c
Peace Cross Cut, Thin Back..... $\text{\$}$ foot 27 $\frac{1}{2}$ c
Richardson's Circular and Mill.....dis 45 @ 45 $\frac{1}{2}$ c
Richardson's X-Cuts, No. 1, 30c; No. 2, 37c; No. 3, 24c

Hack Saws.
Griffin's Hack Saw, complete.....dis 40 $\frac{1}{2}$ c @ 50 c
Griffin's Hack Saw, blades only.....dis 40 $\frac{1}{2}$ c @ 50 c
Star Hack Saws and Blades.....dis 25 c
Diamond Hack Saws and Blades.....dis 25 c
Eureka and Crescent.....dis 25 c

Saw Frames.
White Vermont..... $\text{\$}$ gr 50 @ 110
Red, Polished, and Varnished..... $\text{\$}$ doz 150, dis 25 c

Saw Sets.
Stillman's Genuine..... $\text{\$}$ doz 55.00 and 57.75, dis 40 $\frac{1}{2}$ c
Stillman's Imita..... $\text{\$}$ doz 55.00 and 57.75, dis 40 $\frac{1}{2}$ c
Common Lever..... $\text{\$}$ doz 55.00, dis 40 $\frac{1}{2}$ c
Morrill's No. 1, \$15.00; Nos. 3 & 4, 92 $\frac{1}{2}$dis 40 $\frac{1}{2}$ c @ 50 $\frac{1}{2}$ c
Leach's..... $\text{\$}$ No. 96.00; No. 1, \$15.00, dis 15 @ 20 c
Nash's.....dis 20 $\frac{1}{2}$ c @ 30 $\frac{1}{2}$ c
Hammer, Hotchkiss & Call Co.'s New Pattern.....dis 30 $\frac{1}{2}$ c
Bemis & Call Co.'s Lever and Spring Hammer.....dis 50 $\frac{1}{2}$ c
Bemis & Call Co.'s Plate.....dis 10 c
Bemis & Call Co.'s Cross Cut.....dis 12 $\frac{1}{2}$ c
Aiken's Genuine.....52.00, dis 50 $\frac{1}{2}$ c
Aiken's Imitation.....57.00, dis 50 $\frac{1}{2}$ c
Aiken's Hotchkiss & Call Co.'s.....dis 30 $\frac{1}{2}$ c
Dixton's Star, 30. No. 15, 25.50, dis 30 $\frac{1}{2}$ c @ 30 $\frac{1}{2}$ c
Atkins' Lever.....per doz No. 1, 50.00; No. 2, 50.00
Atkins' Criterion.....per doz 57.50
Croissant Keller, No. 1, \$15.00; No. 2, 20.00, dis 35 $\frac{1}{2}$ c @ 50 $\frac{1}{2}$ c

Saw Tees.
Atkins Perfection.....\$15.00; Excelsior 50.00 $\text{\$}$ doz

Scales.
Hatch, Counter, No. 171, good quality..... $\text{\$}$ doz 82 $\frac{1}{2}$ c
Hatch, Tra. No. 161..... $\text{\$}$ doz 57.75 @ 57.00
Union Platform, Plain.....22.30 @ 22.30
Union Platform, Striped.....22.40 @ 22.50
Chaillon's Grocers' Trip Scales.....dis 50 c
Chaillon's Eureka.....dis 25 c
Chaillon's Portable.....dis 25 c
Family, Turnball's.....dis 25c $\frac{1}{2}$ c

Scale Beams.
Scale Beam, list of Jan. 13, 82, dis 50c $\frac{1}{2}$ c @ 50c $\frac{1}{2}$ c
Scale Beam, Counter.....dis 50c $\frac{1}{2}$ c
Chaillon's No. 1.....dis 45 c
Chaillon's No. 2.....dis 50 c

Scrapers.
Adjustable Box Scraper (R. R. & L. Co.) 36.50, dis 30 $\frac{1}{2}$ c
Box, 1 Handle..... $\text{\$}$ doz 44.00, dis 10 c
Box, 2 Handle..... $\text{\$}$ doz 50.00, dis 10 c
Defiance Box and Ship.....dis 20 $\frac{1}{2}$ c
Flat.....dis 20 $\frac{1}{2}$ c
Shovel..... $\text{\$}$ doz 32.50 net
Ship, Providence Tool Co.....dis 10 c

Screen Window and Door Frames.
Porter's Pat. Window and Door Frame.....dis 33 $\frac{1}{2}$ c
Screen Corner Iron, Warner's.....dis 33 $\frac{1}{2}$ c @ 33 $\frac{1}{2}$ c
Stearns' Frames and Corners.....dis 25 @ 20 $\frac{1}{2}$ c

Screw Drivers.
Douglas Mfg. Co.....dis 20c $\frac{1}{2}$ c
Diston's.....dis 45 $\frac{1}{2}$ c
Diston's Patent Excelsior.....dis 45 $\frac{1}{2}$ c
Buck Bros.....dis 30 c
Sargent & Co.'s Varnished Handles.....dis 70 $\frac{1}{2}$ c
Stanley & L. Co.'s Black Handles.....dis 60 $\frac{1}{2}$ c
Sargent & Co.'s No. 1 Forged Blade.....dis 70 $\frac{1}{2}$ c
Sargent & Co.'s No. 20.....dis 60 $\frac{1}{2}$ c
Sargent & Co.'s Nos. 40 & 30, Cast Steel.....dis 60 $\frac{1}{2}$ c
Sargent & Co.'s No. 60, Round Blade.....dis 70 $\frac{1}{2}$ c
Knapp & Cowles' No. 1.....dis 60 $\frac{1}{2}$ c
Knapp & Cowles' No. 2 Extra.....dis 60 $\frac{1}{2}$ c
Knapp & Cowles' No. 00 & 1.....dis 50 $\frac{1}{2}$ c @ 50 $\frac{1}{2}$ c
Turnbull's.....dis 25 $\frac{1}{2}$ c
Gay & Parsons.....dis 35 c
Champion.....dis 25 c
Clark's Patent.....dis 30 @ 33 $\frac{1}{2}$ c
Craftord Adjustable.....dis 35 c
Elrick & Fowler & Hatchers.....dis 35 @ 25 $\frac{1}{2}$ c
Allard's Spiral, new list.....dis 25 c
Kolb's Common Sense..... $\text{\$}$ doz 35, dis 25 $\frac{1}{2}$ c

Syracuse Screw-Drivers Bts.....	dis 30 & 30 1/2	5
Screw Driver Bts.....	dis 50 & 75	5
Flat Head, Parr's.....	dis 25 & 30	5
Fray's Hol. Hdl. Seta, No. 3, 112.....	dis 25 & 25 1/2	5
P. D. & Co.'s, all Steel.....	dis 50	5
Screws		
Wood Screws—List, Brass, Jan. 27; Iron, July 1, 1887		
Flat Head Iron.....	dis 70	5
Round Head Iron.....	dis 65	5
Flat Head Brass.....	dis 65	5
Round Head Brass.....	dis 60	5
Flat Head Bronze.....	dis 65	5
Round Head Bronze.....	dis 60	5
Nails		
Flat Head, Iron.....	dis 55	5
Round Head, Iron.....	dis 50	5
Bench, Iron.....	dis 55	5
Bench, Wood, Beech.....	dis 55	5
Bench, Wood, Hickory.....	dis 55	5
Hand, Wood.....	dis 55	5
Lead, Blunt Point.....	dis 75	5
Crown and Lag, Gimlet Point.....	dis 75	5
Bed.....	dis 55	5
Hand Rail, Humason, Beckley & Co.'s.....	dis 70	5
Hand Rail, Am. Screw Co.....	dis 75	5
Jack Screws, Millers Falls list.....	dis 50 & 50 1/2	5
Jack Screws, P. S. & W.....	dis 50	5
Jack Screws, Sargent.....	dis 50 & 50 1/2	5
Jack Screws, Stevens.....	dis 40 & 40 1/2	5
Scissors.....	dis 25	5
Leister, complete, 10.00.....	dis 25	5
Leister, complete, 4.00.....	dis 25	5
Myrtle Shears.....	dis 50 & 50 1/2	5
Shears		
American (Cast) Iron.....	dis 75 & 10 & 75 & 10 1/2	5
Pruning.....	dis 75	5
Barnard's Lamp Trimmers.....	dis 75	5
Timbers.....	dis 75	5
Seymour's List, Dec. 1881, dis 60 & 10 & 60 & 10 1/2		
Heinrich's List, Dec. 1881, dis 60 & 10 & 60 & 10 1/2		
Heinrich's Tailor's Shears.....	dis 35	5
First quality C. S. Trimmers.....	dis 50 & 50 1/2	5
Second quality C. S. Trimmers.....	dis 50 & 50 1/2	5
Acme Cast Shears.....	dis 10 & 10 1/2	5
Diamond Cast Shears.....	dis 10 & 10 1/2	5
Clippers.....	dis 10 & 10 1/2	5
Victor Cast Shears.....	dis 75 & 10 & 75 & 10 1/2	5
Howe Bros. & Hulbert, Solid Formed Steel.....	dis 40	5
Cleveland Machine Co., Solid Steel Forged.....	dis 70	5
Clausen Shear Co., Japanned.....	dis 70	5
Clausen Shear Co., Nickel, same list.....	dis 60	5
Shovels		
R. W. & Co., list Jan. 1, 1887.....	dis 50 & 10 & 50 & 10 1/2	5
R. & E., list Dec. 18, 1885.....	dis 55 & 10	5
Corbin's list.....	dis 60 & 10 & 60 & 10 1/2	5
Patent Roller.....	dis 60 & 10 & 60 & 10 1/2	5
Patent Roller, Hatfield's.....	dis 75	5
Russell's Anti-Friction, list Dec. 18, 1885.....	dis 60 & 10	5
McGee's Anti-Friction.....	dis 60	5
Shovel and Spades		
R. & E., list Dec. 18, 1885.....	dis 60 & 10 & 60 & 10 1/2	5
Sargent's list.....	dis 60 & 10	5
Reading list.....	dis 60 & 10 & 60 & 10 1/2	5
Ship Tools		
L. & J. White.....	dis 30 & 30 1/2	5
Albion Mfg. Co.....	dis 30 & 30 1/2	5
Shoes, Horse, Male, &c.....	dis 30 & 30 1/2	5
Burden's, Perkins', Phoenix, at factory..... 44.00		
Male—Add 1/2 to 1/4 to above prices.		
On Wrought		
Ton lots.....	dis 90	5
1000 b. lots.....	dis 90	5
500 b. lots.....	dis 90	5
Shot.....	dis 100	5
Drop, 1/2 bag, 25 b.....	dis 1.25	5
Drop, 1/2 bag, 5 b.....	dis .30	5
Buck and Chilled, 1/2 b.....	dis 1.50	5
Buck and Chilled, 1/2 b bag.....	dis .85	5
Shovels and Spades		
Ames Shovels, Spades, &c., list Nov. 1, 1885.....	dis 20	5
NOTE—Jobbers frequently give 5 & 7 1/2 extra on above.		
Griffith's Black Iron.....	dis 50 & 10 & 50 & 10 1/2	5
Griffith's O. S.....	dis 50 & 10 & 50 & 10 1/2	5
Griffith's Solid Cast Steel R. R. Goods.....	dis 20	5
Old Colony (Sanford Fork & Tool Co.).....	dis 20	5
St. Louis Shovel Co.....	dis 15 & 15 1/2	5
Hussey, Biss & Co.....	dis 15 & 15 1/2	5
Hubbard & Co.....	dis 20 & 20 1/2	5
Lehigh Mfg. Co.....	dis 50 & 10	5
Payne Packer & Son, list January, 1886.....	dis 30	5
Birmingham's (Lowman's Patent).....	dis 30 & 10 & 40	5
Bowland's Black Iron.....	dis 50 & 10	5
Bowland's Steel.....	dis 50 & 10 & 50 & 10 1/2	5
Shovels and Tongs		
Iron Head.....	dis 50 & 10 & 50 & 10 1/2	5
Brass Head.....	dis 50 & 10 & 50 & 10 1/2	5
Skels. Thimble		
Western list.....	dis 75 & 10 & 75 & 10 1/2	5
Columbus Wrt. Steel, list Nov. 1, 1887.....	dis 20	5
Coldbrook's Iron Co.....	dis 50 & 10	5
Utica P. S. T. Skels.....	dis 10	5
Utica Turned and Fitted.....	dis 35	5
Skels.		
Buffalo Metallic, R. S. & Co., new list.....	dis 50 & 25 & 10	5
Barber Flour Sifters.....	dis 35	5
Smith's Adjustable Sifters.....	dis 35	5
Smith's Adjustable Milk Strainer.....	dis 35	5
Smith's Adjustable P. & C. Strainer.....	dis 35	5
Stoves, Wooded, Iron.....	dis 70	5
Meat 18, Nested, 1/2 doz.....	dis 70	5
Meat 20, Nested, 1/2 doz.....	dis 85	5
Meat 24, Nested, 1/2 doz.....	dis 1.00	5
Stoves—School, by case.....	dis 50 & 10	5
Snaps, Harness, &c.		
Anchor (T. & S. Mfg. Co.).....	dis 50	5
Fitch's (Bristol).....	dis 50 & 10	5
Hotchkiss.....	dis 10	5
Andrews.....	dis 60	5
Sargent's Patent Guarded.....	dis 70 & 10 & 70 & 10 1/2	5
German, new list.....	dis 50 & 10	5
Covert.....	dis 50 & 10	5
Covert, New Patent.....	dis 50 & 10	5
Covert New R. E.....	dis 50 & 10	5
Covered Spring.....	dis 50 & 10	5
Soldering Irons		
Covert's Adjustable, list Jan. 1, 1886.....	dis 35 & 10	5
Spoke Shaves—Iron.....	dis 45	5
Wood.....	dis 30	5
Bailey's (Stanley R. & L. Co.).....	dis 40 & 10	5
Stearns.....	dis 30 & 10 & 30 & 10 1/2	5
Spoke Trimmers		
Bonar's.....	dis 10.00, dis 60	5
Stearns.....	dis 30 & 10	5
Ives, No. 1, 11.00; No. 2, 12.00; No. 3, 13.00; No. 4, 14.00; No. 5, 15.00; No. 6, 16.00; No. 7, 17.00; No. 8, 18.00; No. 9, 19.00; No. 10, 20.00; No. 11, 21.00; No. 12, 22.00; No. 13, 23.00; No. 14, 24.00; No. 15, 25.00; No. 16, 26.00; No. 17, 27.00; No. 18, 28.00; No. 19, 29.00; No. 20, 30.00; No. 21, 31.00; No. 22, 32.00; No. 23, 33.00; No. 24, 34.00; No. 25, 35.00; No. 26, 36.00; No. 27, 37.00; No. 28, 38.00; No. 29, 39.00; No. 30, 40.00; No. 31, 41.00; No. 32, 42.00; No. 33, 43.00; No. 34, 44.00; No. 35, 45.00; No. 36, 46.00; No. 37, 47.00; No. 38, 48.00; No. 39, 49.00; No. 40, 50.00; No. 41, 51.00; No. 42, 52.00; No. 43, 53.00; No. 44, 54.00; No. 45, 55.00; No. 46, 56.00; No. 47, 57.00; No. 48, 58.00; No. 49, 59.00; No. 50, 60.00; No. 51, 61.00; No. 52, 62.00; No. 53, 63.00; No. 54, 64.00; No. 55, 65.00; No. 56, 66.00; No. 57, 67.00; No. 58, 68.00; No. 59, 69.00; No. 60, 70.00; No. 61, 71.00; No. 62, 72.00; No. 63, 73.00; No. 64, 74.00; No. 65, 75.00; No. 66, 76.00; No. 67, 77.00; No. 68, 78.00; No. 69, 79.00; No. 70, 80.00; No. 71, 81.00; No. 72, 82.00; No. 73, 83.00; No. 74, 84.00; No. 75, 85.00; No. 76, 86.00; No. 77, 87.00; No. 78, 88.00; No. 79, 89.00; No. 80, 90.00; No. 81, 91.00; No. 82, 92.00; No. 83, 93.00; No. 84, 94.00; No. 85, 95.00; No. 86, 96.00; No. 87, 97.00; No. 88, 98.00; No. 89, 99.00; No. 90, 100.00; No. 91, 101.00; No. 92, 102.00; No. 93, 103.00; No. 94, 104.00; No. 95, 105.00; No. 96, 106.00; No. 97, 107.00; No. 98, 108.00; No. 99, 109.00; No. 100, 110.00; No. 101, 111.00; No. 102, 112.00; No. 103, 113.00; No. 104, 114.00; No. 105, 115.00; No. 106, 116.00; No. 107, 117.00; No. 108, 118.00; No. 109, 119.00; No. 110, 120.00; No. 111, 121.00; No. 112, 122.00; No. 113, 123.00; No. 114, 124.00; No. 115, 125.00; No. 116, 126.00; No. 117, 127.00; No. 118, 128.00; No. 119, 129.00; No. 120, 130.00; No. 121, 131.00; No. 122, 132.00; No. 123, 133.00; No. 124, 134.00; No. 125, 135.00; No. 126, 136.00; No. 127, 137.00; No. 128, 138.00; No. 129, 139.00; No. 130, 140.00; No. 131, 141.00; No. 132, 142.00; No. 133, 143.00; No. 134, 144.00; No. 135, 145.00; No. 136, 146.00; No. 137, 147.00; No. 138, 148.00; No. 139, 149.00; No. 140, 150.00; No. 141, 151.00; No. 142, 152.00; No. 143, 153.00; No. 144, 154.00; No. 145, 155.00; No. 146, 156.00; No. 147, 157.00; No. 148, 158.00; No. 149, 159.00; No. 150, 160.00; No. 151, 161.00; No. 152, 162.00; No. 153, 163.00; No. 154, 164.00; No. 155, 165.00; No. 156, 166.00; No. 157, 167.00; No. 158, 168.00; No. 159, 169.00; No. 160, 170.00; No. 161, 171.00; No. 162, 172.00; No. 163, 173.00; No. 164, 174.00; No. 165, 175.00; No. 166, 176.00; No. 167, 177.00; No. 168, 178.00; No. 169, 179.00; No. 170, 180.00; No. 171, 181.00; No. 172, 182.00; No. 173, 183.00; No. 174, 184.00; No. 175, 185.00; No. 176, 186.00; No. 177, 187.00; No. 178, 188.00; No. 179, 189.00; No. 180, 190.00; No. 181, 191.00; No. 182, 192.00; No. 183, 193.00; No. 184, 194.00; No. 185, 195.00; No. 186, 196.00; No. 187, 197.00; No. 188, 198.00; 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CURRENT METAL PRICES.

JULY 3, 1888.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market reports.

IRON AND STEEL.

Bar Iron from Store.

Common Iron:	
3/4 to 2 in. round and square...	1.90 @ 2.00¢
1 to 6 in. x 3/4 to 1 in.	
Refined Iron:	
3/4 to 2 in. round and square...	2.10 @ 2.25¢
1 to 4 in. x 3/4 to 1 1/2 in.	
4 1/2 to 6 in. x 3/4 to 1 in.	2.30 @ 2.45¢
1 to 6 in. x 1/2 and 5-16	2.30 @ 2.45¢
Rods—3/4 and 1-1/2 round and sq.	2.30 @ 2.45¢
Bands—1 to 6 x 3-16 to No. 12	2.30 @ 2.45¢
"Burden Best" Iron, base price	8.00 @ ...
Burden's "H. B. & S." Iron, base price	2.80 @ ...
"Ulster"	3.10 @ ...
Norway Rods	4.00 @ 5.00¢

Merchant Steel from Store.

Open-Hearth and Bessemer Machinery, Toe Calk, Tire and Sleigh Shoe, base price in small lots	3 1/2¢ @ 3¢
Best Cast Steel, base price in small lots	10¢
Best Cast Steel Machinery, base price in small lots	5 1/2¢ @ 6¢

For Classification and Extras adopted by the Merchant Steel Association of the United States, June 1, 1888, see *The Iron Age*, June 21, 1888.

Sheet Iron from Store.

Common American.	R. G. Cleaned.
10 to 16	2.75 @ 2.80¢
17 to 20	2.85 @ 3.00¢
21 to 24	3.00 @ 3.10¢
25 and 26	3.20 @ 3.50¢
27	3.35 @ 3.75¢
28	3.50 @ 4.00¢
B. B.	2d qual.
Galv'd, 14 to 20	4.50 @ 4.80¢
Galv'd, 21 to 24	4.57 1/2 @ 4.75¢
Galv'd, 25 to 26	5.25 @ 5.12¢
Galv'd, 27	5.62 1/2 @ 5.48¢
Galv'd, 28	6.00 @ 5.85¢
Patent Planchet	10¢
Russia	9 1/4¢ @ 10¢
American Cold Rolled B. B.	5¢ @ 7¢

English Steel from Store.

Best Cast	15¢
Extra Cast	16 1/2¢
Swaged Cast	16¢
Best Double Shear	15¢
Blister, 1st quality	12 1/2¢
German Steel, Best	10¢
2d quality	9¢
Sheet Cast Steel, 1st quality	15¢
2d quality	14¢
3d quality	12 1/2¢

METALS.

Tin.	Per lb.
Banca, Pigs	24¢
Straits, Pigs	20¢
English, Pigs	23¢
Straits in Bars	22¢

Tin Plates.

Charcoal Plates.—Bright.	Per box.
Melny Grade	36.25
" "	6.50
" "	6.25
" "	12.75
" "	7.75
" "	8.00
" "	7.75
" "	15.75
" "	5.75
" "	7.25
Calland Grade	6.00
" "	6.25
" "	6.00
" "	7.50
" "	7.75
" "	7.50
Allaway Grade	5.25 @
" "	5.50 @
" "	5.25 @
" "	10.75 @
" "	6.25 @
" "	6.50 @
" "	6.25 @
" "	12.50
" "	5.00 @
" "	6.00 @

Coke Plates.—Bright.

Steel Coke.—IC, 10 x 14, 14 x 20	4.80 @
" "	7.50 @
" "	10.15
IX, 10 x 14, 14 x 20	5.60
EV Grade.—IC, 10 x 14, 14 x 20	4.70 @
Dean Grade.—IC, 14 x 20	4.63 1/2 @
" "	9.25 @
" "	5.62 1/2 @
" "	11.87 1/2 @
Abecarne Grade.—IC, 14 x 20	4.50 @
" "	9.00 @
" "	5.50 @
" "	10.80

Tin Boiler Plates.

IX, 14 x 26	112 sheets @ \$12.50 @ \$12.75
IX, 14 x 28	112 sheets @ 12.75 @
IX, 14 x 31	112 sheets @ 14.25 @

Copper.

Duty: Pig, Bar and Ingot, 4¢; Old Copper, 3¢	
Manufactured (including all articles of which Copper is a component of chief value, 45 ¢ ad valorem)	
Lake	17¢ @ 17.50¢
"Anchor" Brand	16.50¢ @ 17¢

Ingot.

Prices adopted by the Association of Copper Manufacturers of the United States, December 10, 1887.

Not wider than	Not longer than	And longer than	Over 61 oz.	32 to 64 oz.	16 to 32 oz.	14 to 16 oz.	12 to 14 oz.	10 to 12 oz.	8 to 10 oz.	Less than 8 oz.
30	72	25	25	25	26	27	28	31	33	
31	72	25	25	25	26	28	30	34		
36	96	25	25	25	27	29	33	36		
38	96	25	25	26	28	30	34	38		
48	96	25	25	27	29	31	35			
48	96	25	25	28	30	32				
60	96	25	25	30	32	37				
60	96	25	26	31						
84	96	26	27							
84	96	27	28							
Over 84 in. wide	28	30								

All Bath Tub Sheets..... 16 oz. 14 oz. 12 oz. 10 oz.

Per pound..... \$0.28 0.30 0.32 0.35

Bolt Copper, 3/4 inch diameter and over, per pound..... 25¢

Circles, 60 inches in diameter and less, 8 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 60 inches diameter, up to 96 inches diameter, inclusive, 5 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 96 inches diameter, 6 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Segment and Pattern Sheets, 8 cents per pound advance over price of sheets required to cut them from.

Cold or Hard Rolled Copper, 14 ounces per square foot and heavier, 1 cent per pound over the foregoing prices.

Cold or Hard Rolled Copper, lighter than 14 ounces per square foot, 2 cents per pound over the foregoing prices.

Copper Bottoms, Pits and Flats.

14 ounce to square foot and heavier..... 28¢

12 ounce and up to 14 ounce to square foot..... 29¢

10 ounce and up to 12 ounce..... 31¢

Circles less than 8 inches diameter 2 cents per pound additional.

Circles over 18 inches diameter are not classed as Copper Bottoms.

Tinning.

Tinning sheets on one side, 10, 12 and 14 x 48 each..... 8¢

Tinning sheets on one side, 30 x 60 each..... 30¢

For tinning boiler sizes, 9 in (sheets 14 in. x 60 in.), each..... 15¢

For tinning boiler sizes, 8 in. (sheets 14 in. x 56 in.), each..... 13¢

For tinning boiler sizes, 7 in. (sheets 14 in. x 52 in.) each..... 12¢

Tinning sheets on one side, other sizes, per square foot..... 2 1/2¢

For tinning both sides double the above prices.

Planished Copper.

Planished Copper List May 5, 1888..... Net

Brass and Copper Tubes.

Seamless Copper..... 50¢

Seamless Brass..... 47¢

3/4 inch x 1/2 inch..... 44¢

1/2 inch x 1/2 inch..... 42¢

1/2 inch x 3/4 inch..... 40¢

3/4 inch x 1/2 inch..... 38¢

1/2 inch x 1/2 inch..... 37¢

1/2 inch x 3/4 inch..... 34¢

1 1/4 inch x 1/2 inch..... 31¢

Roll and Sheet Brass.

Discount from list..... 10 @ 15 %

Spelter.

Duty: Pig, Bars and Plates, \$1.50 @ 100 lb.

Western Spelter..... 5 @ 5 1/4¢

"Bergenport"..... 8 1/4¢

"Bertha"..... 7 1/4 @ 8¢

Zinc.

Duty: Sheet, 2 1/4¢ @ lb.

600 lb casks..... 61 1/2¢

Lead.

Duty: Pig, 32 @ 100 lb. Old Lead, 2¢ @ lb. Pipe and Sheets, 3¢ @ lb.

American..... 4 1/4 @ 4 1/2¢

Newark..... 4 1/4 @ 4 1/2¢

Bar..... 4 1/4 @ 4 1/2¢

Pipe..... 6 1/2¢

Tin-Lined Pipe..... 15¢

Block Tin Pipes..... 40¢

Sheet..... 7 1/4¢

Solder.

1/2 @ 1/2 (Guaranteed)..... 15¢

Extra Wiping..... 13¢

The prices of the many other qualities of Solder in the market indicated by private brands vary according to composition.

Antimony.

Cookson..... 13 1/4 @ 14¢

Maett's..... 11 1/4¢

Plumbers' Brass Work.

Discount per cent.

Ground Bibbs and Stops..... 55¢ @ 10¢

Ground Stops, Hydrant Cocks, &c..... 55¢ @ 10¢

Corporation Cocks..... 55¢ @ 10¢

Corporation Cocks, "Mueller" Pattern, from Western list..... 55¢ @ 10¢

Ground Basin and Shampooing Cocks..... 50¢ @ 10¢

Compression Basin Cocks..... 50¢ @ 10¢

Compression Basin and Sink Cocks..... 50¢ @ 10¢

Compression Pantry Cocks..... 50¢ @ 10¢

Compression Double Basin and Shampooing Cocks..... 50¢ @ 10¢

Compression Double Bath Cocks..... 50¢ @ 10¢

Compression Bibbs, Urinal Cocks, Sill Cocks, Stops, Hopper Cocks, Hydrant Cocks and Ball Cocks..... 50¢ @ 10¢

Basin Plugs and Basin Grates..... 55¢ @ 10¢

Bath and Wash Tray Plugs..... 55¢ @ 10¢

Bath Wastes and Washers, Bath and Basin Valves, Sewer and Vacuum Valves, Cistern Valves, Pump Valves and Strainers, Ship Closet Valves and Suction Baskets..... 55¢ @ 10¢

Basin Clamps, Basin Joints and Strainers..... 55¢ @ 10¢

Boiler Couplings, Ground Face, per set \$1.25..... 10

Boiler Couplings, Plain Face, per set, \$1.30..... 10

Water Back Valve and Plain Couplings, Soldering Nipples and Unions..... 55¢ @ 10¢

Union Joints..... 60¢ @ 10¢

Hydrant Nozzles, Handles and Guides, Sockets and Clamps, Street Washer Screws and Guides..... 55¢ @ 10¢

Hose Goods..... 55¢ @ 10¢

Steam and Gas Fitters' Brass and Iron Work.

Discount per cent.

Brass Globe Valves..... 60¢ @ 10¢

Finished Brass Globe Valves, with Finished Brass Wheels..... 40¢ @ 10¢

Brass Globe Valves, with Patent Wood Wheels..... 60¢ @ 10¢

Brass Globe Angle and Corner Valves..... 60¢ @ 10¢

Brass Radiator Angle Valves..... 60¢ @ 10¢

Brass Radiator Angle Valves, Frink's Patent..... 60¢ @ 10¢

Brass Cross and Check Valves..... 60¢ @ 10¢

Brass Check Valves..... 60¢ @ 10¢

Brass Hose Valves..... 60¢ @ 10¢

Brass and Iron Frink Valves..... 60¢ @ 10¢

Brass Safety Valves..... 60¢ @ 10¢

Brass Vacuum Valves..... 60¢ @ 10¢

Brass Whistle Valves..... 60¢ @ 10¢

Brass Balance, Back Pressure and Foot Valves..... 50¢ @ 10¢

Brass Butterfly and Throttle Valves..... 50¢ @ 10¢

Brass Pump Valves..... 50¢ @ 10¢

Brass Steam Cocks..... 57 1/2¢ @ 10¢

Brass Service, Meter and Union Meter Cocks..... 57 1/2¢ @ 10¢

Brass Whistles, Water Gauges and Oil Cups..... 60¢ @ 10¢

Brass Hollow Plug, Tallow and Globe Oil Cups..... 50¢ @ 10¢

Brass Lubricators..... 60¢ @ 10¢

Brass Air Valves..... 60¢ @ 10¢

Brass Air Cocks..... 60¢ @ 10¢

Brass Gauge Cocks..... 55¢ @ 10¢

Brass Cylinder Cocks and Steam Bibbs..... 50¢ @ 10¢

Brass Swing Joints and Expansion Joints..... 50¢ @ 10¢

Brass Test Pumps..... 50¢ @ 10¢

Brass Steam Fittings, Rough..... 60¢ @ 10¢

Brass Steam Fittings, Finished..... 2¢ @ 10¢

Brass Union Joints..... 55¢ @ 10¢

Brass Soldering Unions and Nipples..... 60¢ @ 10¢

Brass Hose Fittings, Fusible and Boiler Plug..... 55¢ @ 10¢

Iron Body Globe, Angle, Cross and Check Valves..... 65¢ @ 10¢

Iron Body Safety, Throttle, Back Pressure, Butterfly and Foot Valves..... 65¢ @ 10¢

Iron Cocks, all iron..... 65¢ @ 10¢

All Iron Valves..... 65¢ @ 10¢

Miscellaneous.

Discount per cent.

Cast Iron Fittings..... 70¢ @ 10

Plugs and Bushings..... 75¢ @ 10

Malleable Iron Unions..... 67 1/2¢

Malleable Iron Fittings..... 25

Paints.

Black, Lamp—Coach Painters'..... 22 @ 24¢

" " Ordinary..... 6¢

Black, Ivory Drop, fair..... 12 @ 15¢

" " best..... 23¢

Black Paint, in oil..... kegs, 8¢; assorted cans, 11¢

Blue, Prussian, fair to best..... 40 @ 55¢

" " in oil..... 45 @ 55¢

" " Chinese dry..... 70¢

" " Ultramarine..... 18 @ 30¢

Brown, Spanish..... 13¢

THE IRON AGE

THURSDAY, JULY 12, 1888.

Electric Welding Machines.

In our issue of March 1, 1888, we referred briefly to the process of electric welding as carried out at the works of the Thomson Electric Welding Company, at Lynn, Mass. In view of the interest attached to the subject we need not specially commend to the attention of our readers the engravings on this page, illustrating two types of machines by means of which their welding is accomplished.

The principle involved in this new art is that of causing currents of electricity to pass through the abutting ends of the pieces of metal which are to be welded, thereby generating heat at the point of contact, which also becomes the point of greatest resistance, while at the same time mechanical pressure is applied to force the parts together. As the currents heat the metal, at their junction, to the welding temperature, the pressure follows up the softening surface until a complete union or weld is effected, and, as the heat is first developed in the interior of the parts to be welded, the interior of the joint is, it is claimed, as efficiently united as the visible exterior. With such a method and apparatus, it is found possible to accomplish not only the common kinds of welding of iron and steel, but of metals which have heretofore resisted attempts at welding, and have had to be brazed or soldered. Pieces of such metals and alloys as wrought iron, silver, copper, brass, lead, tin, zinc, bronze, German silver, platinum, gold and even cast iron, are not only welded to each other, but different metals can be welded one to another in many combinations, extending the applications of the process to the attainment of results heretofore impossible in metal working, while the tensile strength of the welds, as shown by mechanical tests under the direction of the U. S. Ordnance Department, are all that can be desired.

The machines built by the Thomson Electric Welding Company are generators of electricity, so constructed as to produce

the low pressure currents needed in welding and similar work. They are of sizes and types suited to the kind and scale of work, as well as to the nature and location of the power by which they are to be driven. They are built to take power

of work, from the smallest wire to bars of over 8 inches in diameter. For heavier work, such as large forgings of locomotive frames, car axles, shaftings, &c., special forms of machines adapted to the purpose can be supplied by the company,

while by the use of specially adapted holders, applied to the standard forms of machines, various shapes and irregular sizes of metal pieces may be welded without difficulty. The power required for the different sizes varies nearly as the cross sectional area of the material at the joint where the weld is to be made. The welding or working is claimed to be much more economical and far superior to that produced by the ordinary methods, while the currents used are of such low pressure as to render any danger of shocks impossible.

Fig. 1 represents an indirect welding machine as now built for moderately heavy work, such as metal bars of about 2 inches in diameter. This machine takes a current from a dynamo by means of wires and may be placed in any convenient location, more or less distant from the source of power. Fig. 2 represents a type of the direct welding machine, combining both the dynamo and welding apparatus. This can be run by belting directly to the engine or to line shafting. This machine is used for all kinds of light work, its capacity ranging from fine wire to rods of $2\frac{1}{4}$ inches in diameter. The welds, it will be understood, are butt welds and the rods to be united are securely clamped in two arms. This the engravings show clearly.

We need not specially emphasize the fact that the variety of uses to which the process of electric welding may be applied is almost endless. Thus it is adapted to the joining of wires of copper, iron or other metals, or bars of similar or different shapes and sections; making joints at angles with bars, as T or Y joints; making chains of links with double welds, both joints being formed by one operation and ranging from cable work to jewelers' chains, combining the same or different

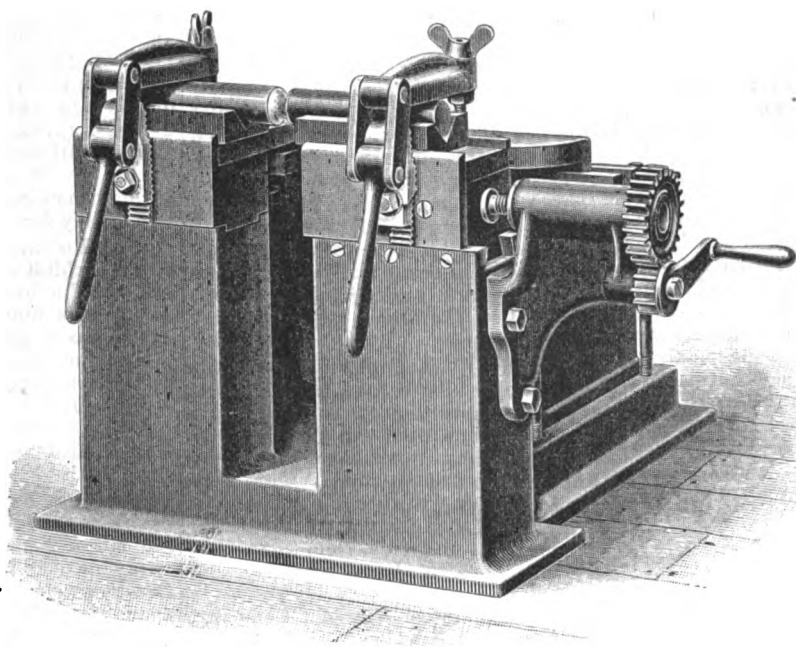


Fig. 1.—Indirect Welding Machine.

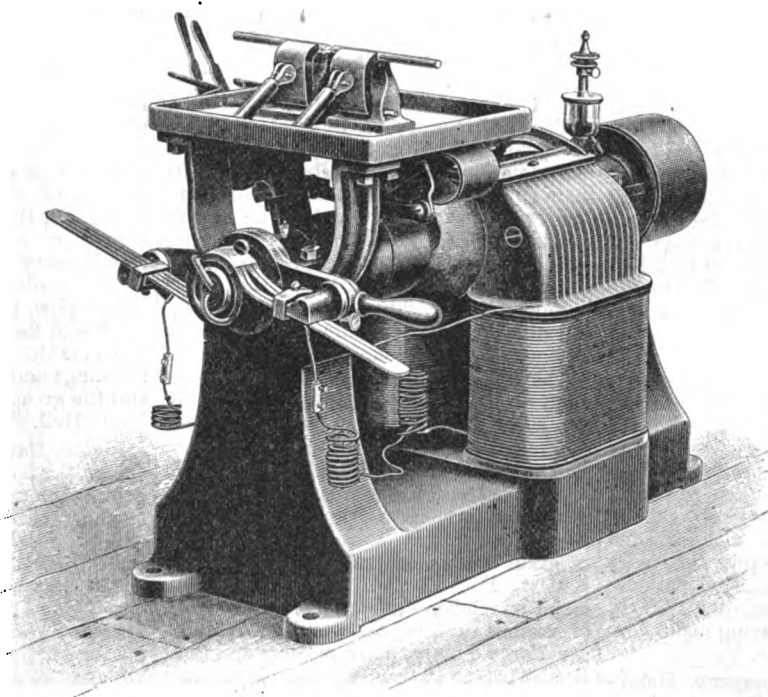


Fig. 2.—Direct Welding Machine.

ELECTRIC WELDING MACHINES, BUILT BY THE THOMSON ELECTRIC WELDING CO., LYNN, MASS.

from any source; to operate wherever placed, by producing directly from such power the necessary currents, or to be supplied by currents taken from a circuit, fed by suitable dynamos at a greater or less distance from the welding apparatus itself. The machines now being manufactured are so graded as to apply to various kinds

ing of wires of copper, iron or other metals, or bars of similar or different shapes and sections; making joints at angles with bars, as T or Y joints; making chains of links with double welds, both joints being formed by one operation and ranging from cable work to jewelers' chains, combining the same or different

metals; constructing or joining, end to end, pipe of all kinds and of large diameters; the working, joining, &c., of lead pipe and the welding in of T connections or elbows into lines of pipe, &c. The operator has absolute control over the heat as, by the simple movement of a lever, the metal can be held at any temperature desired. The welding process, moreover, can be continually watched, as the metal while heating is visible, instead of being covered with coal or hidden by flame, as in the ordinary process. The union further commences at the interior of the joint and not in an uncertain way, as in the ordinary lap welding, and consequently any flaw in the process, it is claimed, can be easily discovered and prevented. The process is almost instantaneous with small diameters, while with larger sizes it requires but a few seconds, depending upon the horse-power used. The external part of the welding circuit is so contrived as to be practically a pair of clamps into which the pieces to be welded may be fastened close to the ends to be joined, so that when these ends are in contact an electric ring circuit is completed, consisting of the part included within the primary coils, the clamps and the metals to be welded. The energy spent in this circuit is easily regulated, and is thus adapted to the demands of the work to be done, whether it be with thick or thin bars or wires. None of the energy is wasted, and there is no expenditure at all when the welding is not in progress.

The Ohio Valley Centennial Exhibition.

The Centennial Exhibition of the Ohio Valley and Central States, active preparations for which have been going on for 12 months past at Cincinnati, Ohio, was opened on Wednesday, July 4, 1888.

The machinery department has an exceptionally fine collection of iron and wood working tools, and is considered fully equal to, if not greater than, that of the Centennial Exposition at Philadelphia in 1876. The G. A. Gray Machinery Company, Cincinnati, exhibit at the main entrance to Machinery Hall, a 10-foot bed planer, 36 inches by 36 inches, with double heads, power quick elevating device, quick return and short run, weight, 13,000 pounds; one single head 5-foot bed, 26 inches by 26 inches, with power elevating device, and one 5-foot bed, 23 inches by 23 inches ditto. All of these machines have a new device for shifting the belts. The machines are highly finished, and especially designed for great durability. This company also exhibit one screw cutting lathe with 26-inch swing, 13-foot bed, compound rest, independent rod feed, weight, 8000 pounds; also one 20-inch swing and one 17-inch, both with 8-foot beds, having compound rests and taper attachments.

The Long & Allstater Company, Hamilton, Ohio, have two exhibits, one embracing a 6-inch angle iron shear, cutting from $\frac{1}{4}$ inch to $\frac{3}{4}$ inch thick; one 3 inches thick; one large plate shear, cutting any size or width of plate; one plate shear and multiple punch combined, shearing up to 50 inches in width by $\frac{3}{4}$ inch thick; one 36-inch deep throat boiler punch, No. 2 size, with capacity for punching through $\frac{3}{4}$ -inch iron; one double No. 3 punch and shear combined; one No. 3 horizontal punch; and one tire welding machine for welding wagon and buggy tires. This machine is one of their latest productions. The welding dies are adjustable by means of cams, the female die remaining stationary, while the male and edging dies are

adjustable to $\frac{1}{8}$ inch, the machine welding tires from $\frac{1}{4}$ inch to $1\frac{1}{2}$ inches wide. Two sizes of this machine are made, each being provided beneath the edging die with a shear attachment for cutting the tire material to the lengths desired. This firm further exhibits a powerful bending and forming machine, also adapted to straightening heavy bars, beams, &c., and for shaping iron suitable to all purposes. Another portion of the hall is occupied by this firm, with a space in which is exhibited every variety of agricultural implements, consisting of rakes, cultivators, plows, feed cutters, &c.

Ritchie & Deyer, Hamilton, Ohio, exhibit a model Parry saw-mill outfit and a 10 horse-power Ritchie traction engine. This has steel gearing and a steel boiler and is well put together. The firm claim to have built the first engine of this type ever used in the United States.

Cordesman, Meyer & Co., Cincinnati, Ohio, manufacturers of wood-working machinery, exhibit some of their latest and best productions, consisting of tilting saw tables, band saws, jointers, planers and mortisers, the whole making a very creditable display.

The Falls Rivet Company, Cuyahoga Falls, Ohio, exhibit their several specialties, consisting of their patent clutch and cut-off couplings, steel-rim pulleys, split pulleys, pedestal stands and boxes and Akron cold-rolled shafting. This firm have supplied the electric light plants at the exposition with shafting and couplings. The clutches are made from 1 to 1000 horse-power, with two, four and six arms.

The National Steel Wire Mat Company, with factories at Cincinnati, Chicago and Beaver Falls, Pa., have an interesting exhibit in the southern end of the hall, consisting of a complete manufacturing plant in operation producing specimens of their goods, the wall space of the exhibit being appropriately decorated with wire mats of the various sizes made. The machinery employed in the manufacture of these goods proves a great attraction to visitors.

The Van Duzen Gas Engine Company, of Cincinnati, have two displays of their gas engines, one immediately adjoining the main entrance to the machinery hall, and the second in the south end. The exhibit consists of 2, 4 and 7 horse-power engines of a new type. They are provided with automatic lubricator similar to the Westinghouse engine, which latter they closely resemble in form, and are claimed to be economical in consumption of gas.

The Iowa Farming Tool Company, Fort Madison, Iowa, have a unique display in pyramidal form, some 20 feet high, 8 feet square at base, and 3 feet 6 inches at apex, consisting of a dark background upon which are secured specimens of the various tools and implements produced by them. A smaller pyramid is used for the display of grain cradles, snaths, ox yokes, &c.

Mast, Foos & Co., Springfield, Ohio, make an elaborate display of iron fencing of various designs, the well-known Buckeye Force Pumps, lawn mowers and their Iron Turbine wind engines, hose reels lawn sprinklers, &c.

The Eagle Machine Company, Lancaster, exhibit well-gotten-up specimens of their hand and power cornshellers, fodder cutters, straw cutters, stackers, screen doors, corn planters, animal pokes, horse-powers, &c.

The Kilbourne & Jacobs Mfg. Company, Columbus, Ohio, exhibit a specimen of every article manufactured by them, embracing wheelbarrows, both wood and iron, wheels, the well-known Columbus steel sinks, road plows, scrapers and express, railroad and freight trucks.

The Wayne Works, of Richmond, Ind., exhibit grain drills, seeders, force feed fertilizers, and their latest novelty, the

Dandy champion steel cart, of which several styles are exhibited. These carts are constructed with single and double seats, are easy of adjustment, and have a superior device in the way of spring.

The Richmond Machine Company display mule and gang saws, head blocks and horizontal engines.

The John H. McGowan Pump Company, Cincinnati, have on exhibition a very interesting display of their Rival boiler feeders, Rival and Duplex steam pumps and the Glide brass valve-box boiler feeders, tobacco presses and machinery. The center of their space is occupied by a water column about 12 inches in diameter and 15 feet high, the top of which is surmounted by a basin about 6 feet in diameter. In the center of this is located a flower vase. The water is forced through the column, filling the basin mentioned to overflowing and producing a very pleasant effect, particularly at night, and cooling the atmosphere very perceptibly for some distance around.

J. M. Robinson & Co., occupying space 9 x 25, exhibit several of their more prominent productions, among which are cornice brakes ranging from 4 up to 8 feet in size, range and safe makers' brakes, box bending machines, hand and power shears, double-acting punching presses, both hand and power.

Pierce, Butler & Pierce, Syracuse, N. Y., exhibit all the various sizes and combinations of the Florida steam heater.

Sebastian, May & Co., Cincinnati, Ohio, have a very fine exhibit of light iron working lathes running in sizes from 8 inches swing up to 18 inches, with distances between centers from 20 to 60 inches. In connection with their exhibit is also a display for Rice, Whitacre & Co., of Chicago, manufacturers of the Kriebel steam launch engine.

The National Machinery Company, of Griffin, Ohio, exhibit various sizes of bolt and nut machinery, of which they make a specialty.

The Laidlaw & Dunn Company, Cincinnati, exhibit a complete line of the Hero vertical boiler feeders, Standard Duplex pumps with brass removable water cylinders, tobacco machinery, &c. Six of these pumps are being used to supply the feeding of the Galloway boilers in the Park Hall, the elevator in the same hall supplying water to the grand waterfall in Horticultural Hall and the grand fountain in Park building. This firm also supplied all the pipe, fittings and valves for steam, water and fire purposes, and pipes and fittings for the extensive gas display in the buildings and streets approaching thereto, and the great electric light chandelier in Music Hall.

Lodge, Davis & Co., Cincinnati, occupy one of the largest spaces in the hall, and exhibit the most comprehensive display of machine tools in the entire building. The exhibit consists of five sizes of turret lathes, 13, 16, 18, 21 and 36 inches. The last three are cabinet styles for boring, chasing and turning taper without swiveling the head. A line of shapers is also exhibited, there being four sizes, 15, 20, 26 and 32 inches. The first three are geared and the 15 inch, operated with a rocker movement, has quick return and is fitted with a special device for altering the length of the stroke from 0 inch to 15 inches while in motion. There is also a device for adjusting the cutting tool to any location in which the work may be placed on the table. The shapers can be rapidly adjusted while in motion, and a shaft of any length may be put clear through directly under the cutter arm, thus enabling the operator to cut a key-way in a shaft at any point desired. All shapers are arranged to make any required changes from one point. A full line of drill presses are also exhibited, ranging in size from 20 to 38 inches swing.

The Coke Trade.

The lockout in the Western iron mills, which is now in its second week, has not as yet had any perceptible effect on coke shipments, nor will it be likely to have any for some weeks to come, should the lockout continue. A more hopeful feeling is being shown by the operators, and it is believed that an improvement in this industry will soon take place. For the week closing June 30 there were 9255 ovens in blast, out of a total of 13,061 ovens in the region, leaving only 3806 idle; the output for that week being estimated at 74,664 tons. For the week previous the figures were: Active ovens, 8903; idle, 4156; tonnage, 72,166. The resumption of a portion of the ovens of the McClure Coke Company which had been idle on account of a strike of the employees, accounts in part for the increase in the number of active ovens and the slight increase in tonnage. The shipments during the week were 4560 cars consigned as follows:

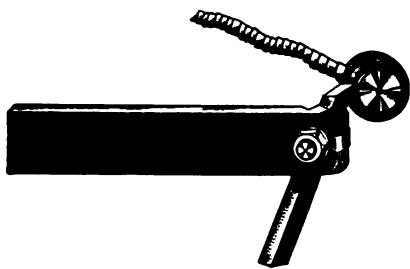


Fig. 1.

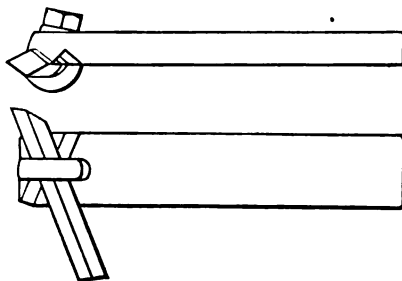


Fig. 2.

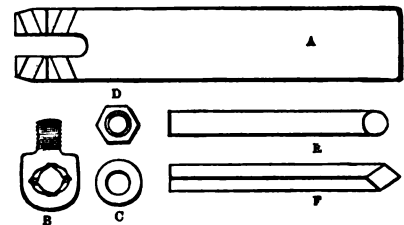


Fig. 3.

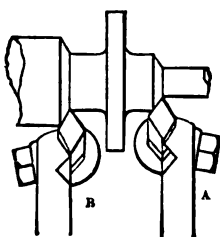


Fig. 4.

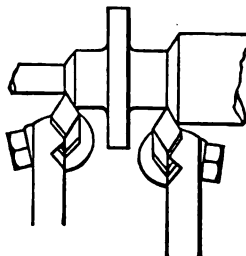


Fig. 5.

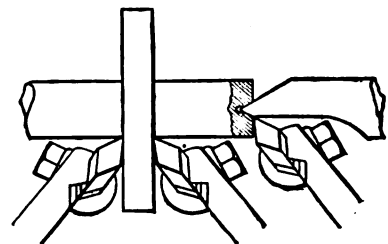


Fig. 6.

LATHE AND PLANER TOOL, MADE BY THE CAPITOL TOOL COMPANY, HARTFORD, CONN.

To Pittsburgh and the rivers, 1200; to the Shenango and Mahoning valleys, Chicago and other Western points, 2060 cars; to eastern points, 1300 cars. The figures for the previous week were: Pittsburgh, 1250; West, 2000; East, 900. The following is a comparative statement of the weekly shipments for the month of June:

	June	9	16	23	30	Total.
To Pittsburgh.....	1,200	1,250	1,250	1,200	4,900	
To Western points.....	3,000	2,400	2,000	2,080	9,480	
To Eastern points.....	1,350	1,150	900	1,300	4,800	
Totals.....	5,550	4,800	4,150	4,580	19,160	

The shipments for May were 24,800 cars, or an average of 918 cars per day for the 27 working days of that month. The shipments for June, as will be seen by the above statement, aggregate 19,160 cars, or an average of but 737 cars daily for the 26 working days of that month. The aggregate for May was consigned as follows: To Pittsburgh, 4300 cars; West, 13,800 cars, and to eastern points 6700 cars. The price of coke remains at \$1, although some sales have been made at 95 cents per ton. There is still some talk of an attempt to revive the old syndicate. Although no definite action has yet been taken in the matter, it is not likely that any decided efforts will be made to form a new syndicate until there

is some improvement in the iron trade, which will consequently cause an improvement in the demand for coke.

Seymour's Lathe and Planer Tool.

The Capitol Tool Company, of Hartford, Conn., are putting on the market a lathe and planer tool which, in general plan, may not be altogether unfamiliar to our readers. The engravings which we annex fully explain its features. The tool is designed to be an efficient and cheap substitute for forged tools for lathes and planers, rigidly holding its cutter and taking as heavy and clean cuts as a forged tool of the same size. It is cheap to use because the cutters are made by cutting from a bar of steel the length required and grinding the end to the desired angle. This plan allows the consumer to make his own cutters at small cost. It does not require an elevating tool block on the lathe, as the cutter can be raised or lowered in

Naval Progress.

The acts of March 3, 1885, August 3, 1886, and March 3, 1887, authorized the construction of ships to cost in the aggregate a trifle less than \$20,000,000. The amount thus far appropriated for these ships is \$8,315,000. This is exclusive of about \$7,000,000 appropriated for guns and armor in 1886 and 1887, of which about \$4,000,000 will be required to pay the contracts made with the Bethlehem Iron Works a year ago, leaving \$3,000,000 to the credit of the Secretary.

Leaving out the double-turreted monitors and the four cruisers, there have been spent on the ships ordered in the past three years \$2,403,935, and the balance on hand for them is \$3,453,848. The double-turreted monitor Miantonomoh will be finished in four months. The large cruiser Baltimore will be launched this month and finished in six months. The Vesuvius will be ready for delivery on September 1. The double-turreted monitor Puritan has had

her dock trial and has been accepted, but her armor has not been put on. The double-turreted monitor Amphitrite is ready for her steam trial, which will occur soon. The machinery for the double-turreted monitor Monadnock is in process of construction at Mare Island Navy Yard, from plans prepared in the Navy Department. Three years ago some of the forgings for the 6-inch guns for the Navy had to be imported from England, and all the forgings for the larger guns had to be brought from abroad. Now the forgings for 8-inch guns are made here, and the contract of last year with the Bethlehem Iron Works will make the United States independent of England, even in the case of forgings for the largest guns projected and for the heaviest steel shafting.

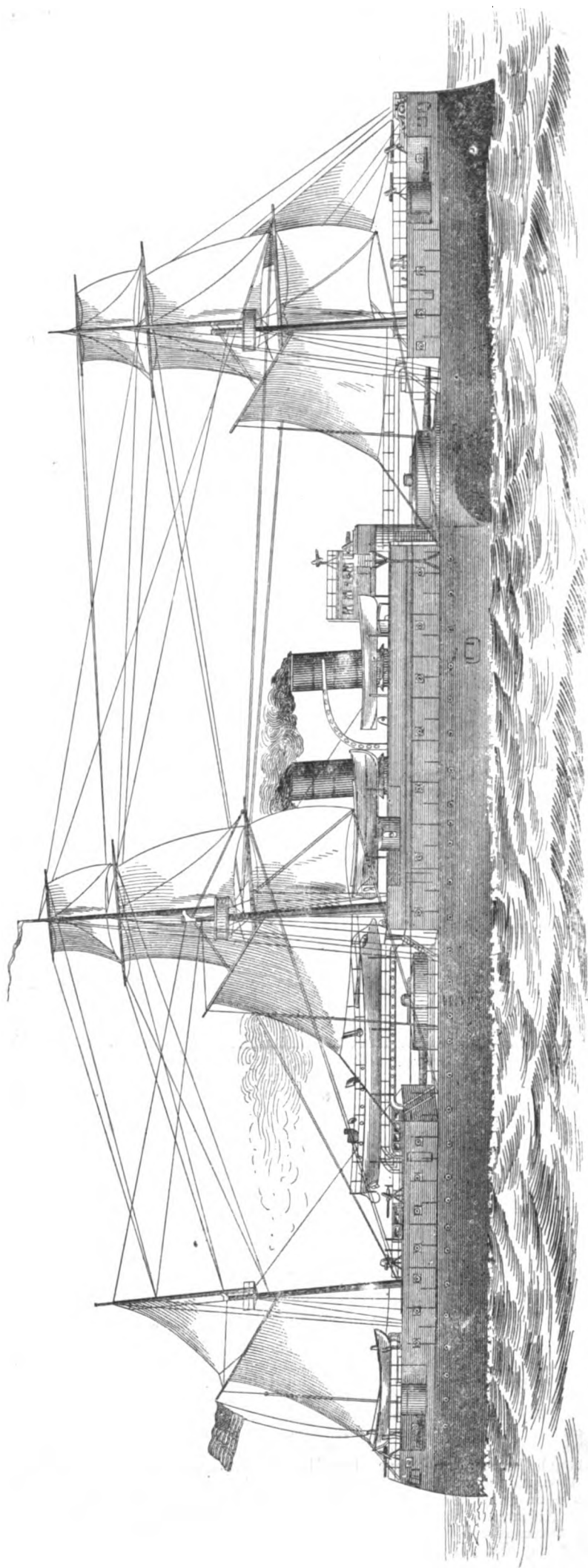
The stern-post of the cruiser San Francisco, which is to be built by the Union Iron Works, in San Francisco, has been successfully cast and the keel is now being laid. The Herreshoff Mfg. Company, at Bristol, R. I., have begun work on the new torpedo boat. This boat will be 138 feet long and will have twin screws, with engines capable of working up to 1800 horse-power. The contract speed is 25 knots an hour and the builders hope to attain 28 knots. The boat will be entirely of steel.

The Cruiser Maine.

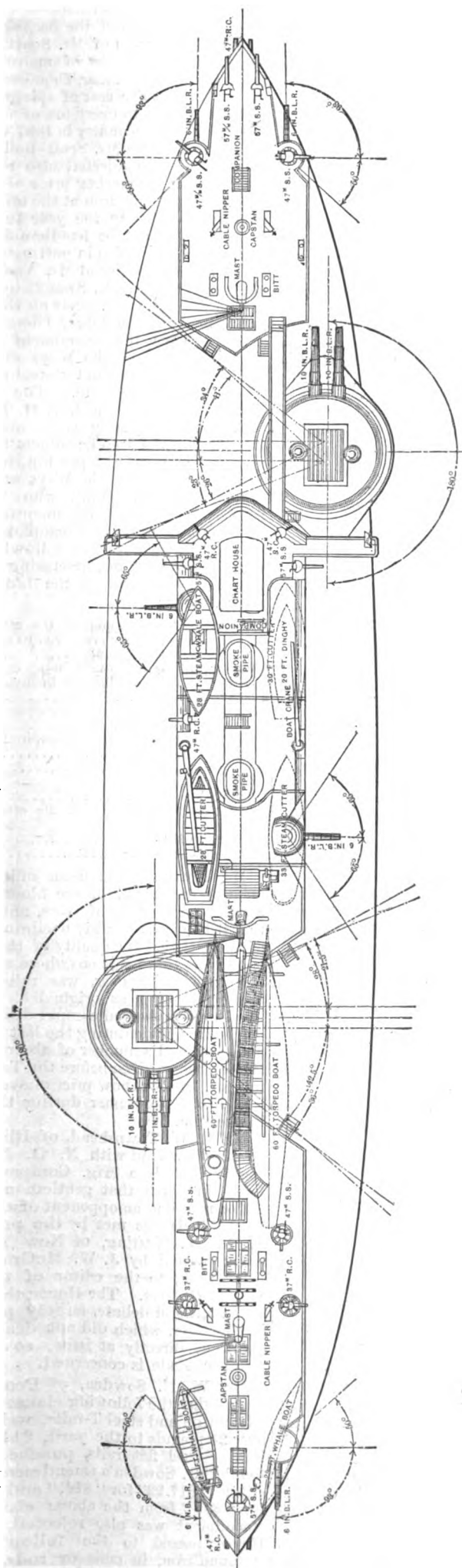
The progress which is being made in the preparations for commencing the building of the cruiser Maine, at the Brooklyn Navy Yard, lends special interest to the engravings which we publish in this issue, representing a general view and deck plans of the ship.

The Maine is a twin-screw armored turret vessel of the belted cruiser type, the vital parts being protected by a belt of armor from shot and shell, sufficient in length to insure stability even if the ends are riddled above the under-water protective decks extending from the ends of the belt to the extremities of the vessel. The vessel will have great coal endurance, good steaming and maneuvering qualities, every modern improvement in offensive and defensive *matériel* and every appliance to insure the comfort and health of officers and crew. In general appearance it resembles the Brazilian armored cruiser Riachuelo, but is larger, and carries heavier guns and thicker armor, besides having greater endurance. The general dimensions are as follows: Length between perpendiculars, 310 feet; breadth, extreme, 57 feet; mean draft of water, $21\frac{1}{4}$ feet; displacement to above draft, 6648 tons; indicated horse-power, 8750; speed, 17 knots; thickness of armor belt, 11 inches. The water-line belt of steel armor just mentioned extends for a length of about 180 feet amidships, and from 3 feet above to 4 feet below the water line. From a point 1 foot below the water line the thickness of the armor gradually decreases to 6 inches at the bottom. The wood backing is 8 inches thick. The plating behind the armor is in two thicknesses, stiffened by horizontal angle bars. The athwartship armor bulkhead at the forward end of the armor belt is 6 inches thick. The revolving turrets are protected by $10\frac{1}{4}$ inch steel armor, the gun port plates being $11\frac{1}{4}$ inches. The revolving parts of the turrets and the spaces required for loading are protected by fixed breastworks of oval shape, $10\frac{1}{4}$ inches thick. There is an armored conning tower, 10 inches thick, located on the central superstructure, elliptical in shape, measuring 10 feet 6 inches by 9 feet. An armored tube $4\frac{1}{2}$ inches thick runs from this tower to the armor deck, to protect steering gear, speaking-tubes, &c. The armor deck plating in the works of the armor belt will be in two thicknesses, so disposed that one layer of plating forms edge strips and butt straps for the other. The armor deck slopes from the top of the belt at its after end, the slope being 4 inches thick. The under-water deck at the end is 2 inches thick, protecting the magazine and steering gear, and so arranged as to give great stiffness to the ram bow. Cofferdams will be built above the engine and fire-room hatches to a height of 3 feet above the berth deck.

The vessel is bark rigged, spreading 7135 square feet of canvas. The fore and main masts are fitted with military tops, each mounting two machine guns. The rigging is brought down in such a manner as not to interfere with the fire of the guns. In addition to the armored conning tower there is a wooden chart-house, fitted with chart tables, speaking-tubes, indicators, steering-wheels, &c., for use when not in action. A steam steering-engine is fitted, in addition to the hand-steering arrangements, and there are steam capstans, windlasses and hoists. The forward hawse-pipes are so formed as to be adapted to a stockless anchor, the entrance being enlarged to take the shank and flukes of the anchor, the latter stowing itself automatically within the ship on heaving to. Shutters will be fitted over the mouths of the hawse-pipes. There are 174 water-tight compartments in the



U. S. ARMORED CRUISER MAINE, TO BE BUILT AT THE BROOKLYN NAVY YARD.



Main and Superstructure Decks.

vessel and ample provision is made for natural light and ventilation by means of skylights, side-lights and cowls. Artificial ventilation is also provided for. The vitiated air of the engine-room will be withdrawn by the fans used for forced combustion. The explosive gases of the coal bunkers are led into the funnel casings and fresh-air pipes lead to the upper deck.

The pumping and draining system is very elaborate, every compartment of the vessel being in connection with powerful steam and hand pumps. The electric plant consists of four sets of dynamos and engines, so connected that any one can supply all the circuits for the incandescent lamps. There are three search-lights, any of which can be connected with any dynamo. These dynamos supply also light for internal illumination, side-lights, head-lights and lights in magazines and bunkers. In addition to the usual allowance of boats supplied to a man-of-war, including steam launch and cutter, there are two torpedo boats, 60 feet long. The height in the clear between the berth-deck planks and bottom of the main-deck beams is 7 feet 10 inches. The height in clear between the main-deck plank and bottom of super-structure decks is 6 feet 8 inches.

The vessel will have two vertical inverted triple-expansion engines in separate water-tight compartments, capable of developing 8750 horse-power. The cylinders are 35½, 57 and 88 inches in diameter respectively, with a stroke of 36 inches. There will be eight cylindrical return tubular boilers, 14 feet 8 inches diameter and 10 feet long, each having three furnaces, the total grate surface being 552 square feet. The fire-rooms are not to be put under pressure, but the forced draft will be secured by leading air to the under side of the grate-bars, forced through ducts by four blowers of 26,000 cubic feet capacity per minute. There are two three-bladed screws with a diameter of about 15 feet. The coal at normal draft is 400 tons, but the bunker capacity is 822 tons. The endurance and radius of action at different speeds with 400 tons of coal are: At 17 knots per hour, 960 knots; at 15 knots per hour, 1617 knots; at 10 knots per hour, 4250 knots.

The main battery consists of four 10-inch and six 6-inch breech-loading guns. The 10-inch guns are mounted in pairs in turrets protected by 10½ inches of steel armor. The turrets are placed *en echelon*, so that four guns can be fired ahead or astern. Each has a complete broadside train on one side of 180° and on the other side of over 60°. Each turret has two loading positions. The guns are loaded, elevated and trained by the latest and most approved systems, all machinery being protected by oblong breastworks 10½ inches thick. The 6-inch guns are mounted on central pivot carriages, protected by segmental steel shields 2 inches thick. Two 6-inch guns are placed directly forward and two directly aft, having a train each of 147°. A 6-inch gun is mounted on each side of the central superstructure having a train of 130°. The forward and after guns can be converged at a point 150 feet from their respective ends. The four 10-inch and two 6-inch guns can be fired directly ahead or astern, and the broadside fire of four 10-inch and three 6-inch guns can be converged at a point 100 feet from the side. The secondary battery is so disposed as to secure a heavy bow and stern fire. It consists of four 57 mm. rapid-fire guns, four 47 mm. rapid-fire guns, four 47 mm. revolving cannon, nine 37 mm. revolving cannon and four Gatling guns. There are seven torpedo launching tubes or guns, three below the water and four on the berth deck. The 10-inch guns fire a projectile of 500 pounds weight with 250 pounds of powder, and have a maximum

effective range of about 9 miles. The weight of shot that can be fired ahead or astern from the main battery is 2200 pounds, and either side 2300 pounds.

The Hall Electric Pump.

The Hall Electric Pump Company, of Plainfield, N. J., with New York offices in the *Tribune* Building, have just made an interesting application of electricity to pumping for domestic water supply. The result is the Hall Electric Pump, of which we annex an engraving, and which is simply a combination of a rotary pump and an electric motor, the power being transmitted from the motor to the pump by a worm gear.

The illustration shows a motor of $\frac{1}{4}$ horse-power. The worm on the motor shaft is of steel and runs in a box of oil; the pinion attached to the pump shaft is of best bronze; the pump, of the most improved

the pump is at work refilling the tank, and it will not stop until the normal level is regained, when the rising float cuts the circuit and stops the motor. This automatic action of the machinery constitutes its leading recommendation. The electrical current being provided the motor and pump are always ready, and there is no use for attendance other than a weekly or fortnightly supply of oil.

The Metal Schedule Before the House.

On the 3d of the month the metal schedule was finally reached by the House, after a lengthy discussion relating to the duty on glass, which crowded over into the consideration of the iron duty, practically cutting off any discussion on the latter. Mr. McKinley offered as an amendment to make the duty on pig iron \$6.72—an amendment which was rejected, leaving the rate as now proposed under the Mills

attention to the fact that while the rate is \$6 per ton for pig metal it will be only \$8, or about that, for steel slabs.

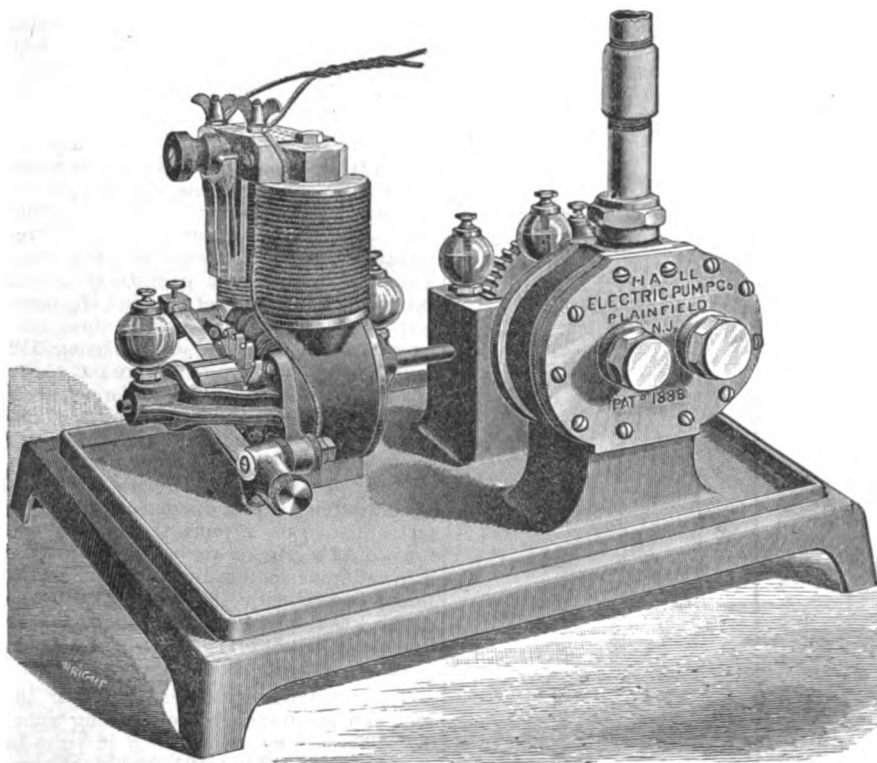
Mr. Dalzell seized the occasion to review the statements of Mr. Scott, of Erie, in regard to the cost of manufacturing steel rails at the Edgar Thomson Works. He stated that the cost of spiegeleisen or ferromanganese in every ton of steel rails produced in this country in 1887 was about \$3, an item which Mr. Scott had entirely overlooked. He objected also to the figure given as the market price of 1 ton of No. 1 Bessemer pig iron at the mill as \$18, holding that during the year 1887 a fair average would not be less than \$20. Mr. Dalzell succeeded also in putting on record the well-known letter of Mr. Andrew Carnegie to Mr. James M. Swank, in reply to the statements of Mr. Scott on the alleged profits made by the Edgar Thomson Steel Works. Then the amendment proposed by the member of the Ways and Means Committee, striking out "steel slabs and billets," was agreed to. The bar iron clause was then reached, J. H. Moffit, of New York, proposing as an amendment that all charcoal iron be subject to a duty of not less than \$22 per ton, instead of \$20, as proposed by the Ways and Means Committee. Mr. Moffit, who has been actively engaged in the manufacture of charcoal iron on Lake Champlain for the past 16 years, gave the following statement of cost of manufacturing a ton of charcoal bloom iron in the Lake Champlain district:

7½ cords of coal wood on the stump (which is the amount required to manufacture a ton of iron).....	\$0.75
Cutting and hauling, at \$1.50 per cord.....	11.25
Coaling and delivering 340 bushels of charcoal.....	7.00
Mining, separating and transporting 2 tons of ore.....	18.00
Making and hammering the iron, including superintendence.....	8.00
Maintenance of plant.....	2.00
Total.....	\$42.00
Deduct value of wood on the stump \$0.75.....	
And ore in the ground.....	\$1.05
Labor cost in each ton.....	\$40.95

Mr. Moffit presented an official statement of the output of ore blooms in the country for a series of years, and showed that it had been steadily declining in spite of the fact that the quality of the product is equal to that made anywhere else. The amendment, however, was rejected, the clause standing as originally proposed. Mr. Burrows showed a rapid development of the iron trade during the last 40 years, and presented a number of abstracts from the testimony given before the Tariff Commission, to show how prices have been reduced to the consumer during the period in question.

Mr. R. W. Townshend, of Illinois, had an interview read with N. O. Nelson, of the N. O. Nelson Mfg. Company, of St. Louis, in which that gentleman put himself on record as an opponent of a protective tariff. This was met by the presentation by N. W. Nutting, of New York, of a letter written by J. W. McGranahan, of New York, to the editor of the *Tariff League Bulletin*. The House then drifted into a general debate, largely political in its character, which did not deal with the questions directly at issue, so far as the metal schedule is concerned.

Mr. W. H. Sowden, of Pennsylvania, moved that the following clause be amended: "Iron and steel T-rails, weighing not over 25 pounds to the yard, \$14 per ton; iron or steel flat rails, punched, \$15 per ton." Mr. Sowden's amendment is to substitute "\$17.92" for "\$14," and "\$20.16" for "\$15" from the above clause. This amendment was also rejected, and the House passed to the following item: "Round iron, in coils or rods, less than $\frac{1}{4}$ inch in diameter, and bars or shapes of rolled iron not specially enumerated or



ELECTRIC PUMP, BUILT BY THE HALL ELECTRIC PUMP COMPANY, PLAINFIELD, N. J.

rotary principle, is also of bronze; the bed plate is of iron. Self-feeding oil cups, each containing one or more week's supply of oil according to the work required, keep all bearings lubricated, and when the pump is at rest no oil escapes. The floor space required is 15 inches by 16 inches, and the height of the pump is 12 inches. A neat hardwood case keeps out all dust or dirt and prevents meddling with the motor. The electricity must be taken from a dynamo, and either an arc or an incandescent circuit can be used, but the latter is always preferable on account of its safety. In the tank a snap electric switch regulates the supply of water. A common ball float attached to the switch closes or cuts the circuit as water is drawn off, or is returned to the tank.

The action of the pump is purely automatic. Connection is made with the electric circuit by the two wires shown at top of motor and at the switch in the tank. Water is drawn in a bathroom, in the kitchen, the laundry or bedroom, and as soon as the ball float has dropped to the point to which it is regulated, the switch is snapped by the weight of the ball in falling, the circuit is closed, and instantly

bill—\$6 per ton. An amendment to strike out the clause, "Iron railway bars weighing more than 25 pounds to the yard, \$11 per ton," was rejected, leaving the rate as proposed. Mr. McMillen, a member of the Ways and Means Committee, proposed to strike out the words "slabs and billets of steel" out of the following: "Steel railway bars and railway bars made in part of steel, weighing more than 25 pounds to the yard, and slabs and billets of steel, \$11 per ton." The reason given for this amendment was that the railroad bar is the advanced product of the billets and that the Ways and Means Committee did not think it proper to fix the same rate of duty on slabs and billets as fixed upon the more advanced product—namely, the railroad bar. Upon inquiry emanating from Mr. Bayne, of Pennsylvania, the Ways and Means Committee stated that slabs will remain as at present, 45 per cent. Mr. Bayne called attention to the fact that the equivalent of this 45 per cent. ad valorem rate of duty is about \$8 per ton. He urged that the duty is too low and that there ought to be some disposition to rectify the error made and put steel slabs at the proper rate. He called

provided for, 1 cent per pound." Mr. Breckinridge, of Arkansas, a member of the committee, offered the following amendment: "Iron or steel, flat, with longitudinal ribs, for the manufacture of fences, $\frac{1}{8}$ cent per pound." In reply to the question of J. Buchanan, of New Jersey, whether the paragraph in question does not in effect propose a change of duty on one class of rods, advancing the rate on those rods which are between $\frac{1}{8}$ inch in diameter and No. 5 wire gauge, from $\frac{1}{8}$ cent to 1 cent a pound, Mr. Breckinridge replied that the committee did not believe that the bill has that effect. He stated that the words of the present law are not changed, and it continues to stand: "Iron or steel rivet, screw, rail and fence-wire rods, round, in coils or loops, not lighter than No. 5 wire gauge, valued at $\frac{3}{4}$ cents or less per pound, $\frac{1}{8}$ cent per pound." Mr. Buchanan urged that the item proposed would be held to embrace all sizes below $\frac{1}{8}$ inch in diameter, and was answered again by Mr. Breckinridge that they did not understand them in that way, that the item enumerated is not in the bill, and consequently remains unchanged as in the present law. The amendment making the rate of duty on "flat iron or steel, with longitudinal ribs, $\frac{1}{8}$ cent per pound" was then accepted. Passing to the sheet-iron clause, Mr. McKinley's amendment to strike out the paragraph was rejected without debate.

The hoop iron clause was then taken up, and the discussion naturally drifted to cotton ties, which, however, is to be taken up in another paragraph of the bill. Mr. McKinley's amendment to strike out the entire paragraph was lost. The item "cut tacks, brads or sprigs, 35 per cent. ad valorem" was taken up, the existing law providing as follows: "Cut tacks, brads, or sprigs, not exceeding 16 ounces to the 1000, $2\frac{1}{2}$ cents per 1000; exceeding 16 ounces to the 1000, 3 cents per pound." Attention was called to the fact that for the first time thus far in the metal schedule the committee has changed a specific to an ad valorem rate of duty. Mr. Breckinridge stated that not having a guide or a record of any statistics which would give the equivalent of a fair ad valorem rate, the committee had to give up entirely trying to find a specific rate, and upon this particular item to fix the ad valorem rate established by the bill, which is the ad valorem specific of the different items. This led to an extended debate on the merits of ad valorem and specific duties. The discussion appears to have ended without any vote on the pending item.

"Iron or steel railway fish-plates or splice-bars, $\frac{1}{8}$ cent per pound" was the next item taken up, to which an amendment was offered making the rate 1 cent per pound, Mr. Buchanan urging that since bar iron was made $\frac{1}{8}$ cent a pound it would be only fair to the maker of fish-plates to place the duty at a rate more in proportion with that of the raw material.

On Saturday, July 7, the tariff was again taken up, the proposal to raise the duty on fish plates to 1 cent per pound being rejected. Mr. Bayne moved to strike out the paragraph making the duty on "wrought iron or steel spikes, nuts and washers, and horse, mule or ox shoes $1\frac{1}{2}$ cents per pound," on the ground that the reduction of the surplus is not likely to be facilitated to any great extent by embodying the item in the bill. The amendment was rejected, and the House passed to the item "iron or steel rivets, bolts, with or without threads or nuts, or bolt blanks, and finished hinges or hinge blanks, $1\frac{1}{2}$ cents per pound." Mr. Buchanan offered as an amendment the insertion of a new paragraph, reading: "Iron or steel rivet, screw, nail and fence wire rods, round, in coils and loops, not lighter than No. 5 wire gauge, valued at $\frac{3}{4}$ cents or less per

pound, 1 cent per pound." He said this amendment was offered in order to make two provisions in reference to iron rods harmonize. The sizes of iron rods between No. 5 wire gauge and $\frac{1}{8}$ inch in diameter are put in one part of the law at one rate of duty and in another part at another rate. In the Mills bill but one of these provisions is copied, and in that provision there is a rate fixed of 1 cent per pound. The amendment, however, was rejected, as was also the motion to strike out the following paragraphs:

"Horseshoe nails, hob-nails and wire nails, and all other wrought iron or steel nails, not specially enumerated or provided for, $2\frac{1}{2}$ cents per pound."

"Boiler-tubes, or other tubes, or flues, or stays of wrought iron or steel, $1\frac{1}{2}$ cents per pound."

The Mills bill fixes "files, file-blanks, rasps and floats of all cuts and kinds, 35 per cent. ad valorem," for which Mr. Farquhar, of New York, moved to substitute the following: "Files, file-blanks, rasps and floats of all cuts and kinds, 4 inches in length and under, 35 cents per dozen; over 4 inches in length and under 9 inches, 75 cents per dozen; 9 inches in length and under 14 inches, $\$1.50$ per dozen; 14 inches in length and over, $\$2.50$ per dozen." Mr. Farquhar submitted a letter by Mr. W. T. Nicholson, manager of the Nicholson File Works, of Providence, R. I., in which that expert called attention to the fact that when he entered the business in 1865 the English list price on the coarser class of goods was $\$7$ per dozen. He began selling at $\$7$, 10 per cent. off. To-day he states that he sells the same goods for $\$2.30$ per dozen, the market price being $\$7$, 70 per cent. off, or $\$2.10$. The substitution of ad valorem for a specific duty, as proposed in this file item, was made the subject of a prolonged discussion. Mr. H. J. Spooner, of Rhode Island, reviewing the duty on files, alluded to the fact that labor is an important interest concerned in its manufacture. This he illustrated by the recital of facts which he stated to have from unquestionable authority. "A pound of steel, from which the finest grades of these files are made, costs 40 cents, and when made into files its value is enhanced to $\$59.35$, an increase of 14,740 per cent. The great cost of this manufacture is in the labor employed, and it is principally for the protection of that labor that such protective duties as existing law provides are required. Upon 1 pound of steel used in the manufacture of medium grades of files, costing 38 cents, the value is increased by manufacture into such files to $\$18.20$, an increase of 4690 per cent.; and in the coarser grades of files a pound of steel costing 6 cents is enhanced in value by manufacture 1640 per cent." Mr. Farquhar's amendment was rejected, the House passing to the next clause relating to "iron or steel beams, girders, joists, angles, channels, car-track channels, T columns and posts, or parts or sections of columns and posts, deck and bulb beams and building forms, together with all other structural shapes of iron or steel, $\frac{1}{8}$ cent per pound." Mr. J. D. Long, of Massachusetts, secured consent at this point to read a letter written by Loring & Parks, Cobb & Drew and the Plymouth Mills, all of Plymouth, on the tack duty. We quote from it the following: "Iron tack plate costs English tack manufacturers from $1\frac{1}{4}$ to $1\frac{1}{2}$ cents a pound. Ours costs us 2 cents a pound, or about 33 $\frac{1}{3}$ per cent. more. English tack manufacturers pay their tack-makers 1s. 3d., or say 31 cents per 100,000, while we pay 50, 60 and 75 cents per 100,000. For the same quality and grade of work we pay 100 per cent. for cutting. If the duty is reduced to 35 per cent. ad valorem we must reduce the wages of our help at least 33 $\frac{1}{3}$ per cent. to compete."

Referring to the item on "beams and structural iron," Mr. Buchanan, of New Jersey, read from a letter from an officer of the New Jersey Steel and Iron Company, in which the proposed duty was denounced as an outrage. Attention was called to the fact that while common bar iron is placed at $\frac{1}{8}$ cent a pound, the rate proposed on structural iron difficult to roll is only $\frac{1}{8}$ cent. Mr. Mills claimed that even at the reduction proposed the duty was equivalent to 49 per cent., and pressing a vote secured a rejection of the amendment to strike out the paragraph in question. A similar fate was met by the clause relating to "steel wheels, tires and tire-blanks."

The proposed item relating to wood screws, placing them at 35 per cent. ad valorem, was struck out with the consent of the Ways and Means Committee.

The House then drifted into a long discussion of the duty on lead in argentiferous ores, and finally took up the item of "needles for knitting and sewing machines, 20 per cent. ad valorem." A motion to substitute 35 per cent. for the 20 proposed under the bill was rejected, in spite of the statements contained in a letter written by Mr. George H. Bleloch, of Springfield, Mass., from which quotations were read.

The proposed 35 per cent. ad valorem rate of duty on "pen-knives, pocket-knives of all kinds and razors," was struck out at the suggestion of Mr. Mills, but the proposal to substitute 10 cents per gross for the 35 per cent. ad valorem rate was defeated.

Our Fortifications.—The scope of the Fortification bill, to be reported to the House by the Appropriations Committee, is for an expenditure of $\$36,000,000$. It provides for experiments with iron guns of 10, 12, 14, 16, 18 and 20 inch caliber; converted guns, multicharge and wire-bound guns, for mortars 12 inches in caliber, steel, cast iron, muzzle and breech-loading. The Secretary of War, Secretary of the Navy, Chief of Ordnance of the Army and Navy and several civilian experts are to constitute the board, who can enter into a contract for furnishing any of the guns that pass the test and are deemed fit to use in either branch of the service. The appropriation is to be continued indefinitely and not to be covered into the Treasury. If contractors, after the expiration of the time specified, fail to deliver the guns, they are to pay to the Government 6 per cent. interest on the contract price. If the guns are furnished before the specified time, the contractors are to receive 6 per cent. for their prompt service. The details of the bill cover 64 printed pages, and the probability is that it will not be considered at this session.

The Longest Tangent in the World.—The new Argentine-Pacific Railroad, from Buenos Ayres to the foot of the Andes, has on it what is probably the longest tangent in the world. This is 340 km. (211 miles) without a curve. It is also a remarkable fact that in this distance there is not a single bridge and no opening larger than an ordinary culvert. The level nature of the country will be appreciated from the statement of the further fact that on the 340 km. there is no cut greater than 1 m. in depth and no fill of a height exceeding 1 m. The country, in fact, seems to be almost an ideal one for railroad construction. There are some drawbacks, however, one being that there is almost an entire absence of wood on the plain across which the western end of the road is located. This has led to the extensive use of metallic ties, which will be used on nearly the entire road. Work has already been begun on the mountain section of the road, which is to cross the Andes and unite with the Chilean line.

THE WEEK.

Immigration at this port during the 12 months ended June 30 was larger than ever before, excepting the years 1881, 1882 and 1883. The total was 550,000 persons, which is 60,000 in excess of the previous year, and there are no signs of a decrease in the future.

The exact amount paid thus far for work and materials on the new City Hall in Philadelphia is \$12,025,332.31.

The French Chamber of Deputies has approved the provision of the Factory bill which makes it incumbent upon employers to give their operatives one day's rest weekly. "Fearing to appear too clerical," the Chamber refused to specify that this day should be Sunday.

The population of Utah is now about 200,000. Of this number about 55,000 are Gentiles. The Mormons follow agriculture mainly as a means of livelihood, while the Gentiles are largely engaged in mining, trade and the practice of the professions. The Territory is 325 miles in length by 300 miles in breadth, and it consists of a succession of rugged mountains holding in their arms fertile valleys, some of great extent. The assessed valuation of the Territory, not including the mines, is about \$35,000,000, and of this amount the Mormons own about 60 per cent., the Gentiles 30 per cent., and the remainder is the property of railroads. Of the resources of the country Judge Powers, of Salt Lake City, speaks with enthusiasm. He says: "We have pure alabaster, fine Carrara marble, magnificent granite, elegant brown stone and white sand stone right at our doors. We have 100 square miles of coal fields, mountains of copper and more mountains of iron. We have great beds of sulphur that range in purity from 45 to 99 per cent. We have two saltpeter mines, the only ones in North America; lakes of borax, wells of petroleum and mines of rock salt. In addition we can manufacture pure salt for \$1.50 per ton from the Great Salt Lake. Salt Lake City has a population of 35,000."

The new bill for the protection of New York harbor, which has become a law by the President's signature and goes into effect at once, provides that the President shall designate an officer of the United States Navy as supervisor of the harbor. It shall be his duty to define the exact limits within which deposits of refuse may be made and to grant permits for that purpose. Discharging or depositing matter of any kind in New York harbor or adjacent waters without a permit from this officer, or otherwise than as sanctioned by him, is declared a misdemeanor, and all persons implicated in such an offense are subject to fine of from \$250 to \$2500 and imprisonment of from 30 days to one year. The penalties imposed by the act are made applicable to all officers of tugs, scows or other vessels aiding in unlawful dumping into the harbor, to persons who employ others to make disposition of refuse and to all directly or indirectly concerned. The supervisor of the harbor is made responsible for the enforcement of the law, and is empowered to spend \$30,000 in carrying it out by the employment of patrol boats and by such other means as he sees fit.

Four river thieves who have successfully followed their profession for some months past at the wharves of the Ocean Steam Navigation Company, were captured while at work in the hold of a vessel abstracting cotton from the bales. They were detected at night by special officers disguised as longshoremen. On a table in the captain's cabin was a well-made steel bar with a split end, made to fit beneath the closely

knitted iron bands which inclose the cotton in a bale. The clamps on the hoops were turned, two layers of cotton extracted, the bales rehooped and stamped upon until the partially released contents filled up the space. Thousands of bales of cotton had been treated in this way, and the proceeds were divided equally between six conspirators. The cotton once removed cannot be identified, and its sale cannot be accepted as evidence of guilt.

Notice was served on the Iowa Railroad commissioners by an order from Justice Miller for them to appear in the United States Circuit Court at a hearing in chancery before him in August 6. It is expected that at the time named application will be made to Justice Miller for a permanent injunction restraining the commissioners from putting into force the new schedule of rates.

The Minneapolis Chamber of Commerce protests against the enforcement of any rule prohibiting railroads from charging less on through shipments for export than for delivery at the seaboard.

The Brotherhood of Locomotive Engineers observe the 25th anniversary of their organization in Detroit, August 17th, and 5000 engineers are expected to participate, from all parts of the United States and the Dominion of Canada.

One of the largest cargoes of iron ore ever received from a foreign port was discharged at Port Richmond last week for the Bethlehem Iron Company. It comprised 3650 tons, and was from the mines at Santiago de Cuba.

The Southern Pacific Company contemplate the construction of a \$2,000,000 bridge over the Carguinez Straits, which will greatly facilitate the conduct of its business. Engineer Thomas, of the Chicago Bridge Company, and J. S. Santher are making investigations to determine the feasibility of the project. The bridge will enable the Southern Pacific to save considerable time and expense in the operation of its Sacramento division.

The railroad companies in the vicinity of New York are preparing for the opening of the Arthur Kill bridge to Staten Island. The Pennsylvania Railway Company have completed a new ferry-house for their Staten Island ferry. The New Jersey Central Company are preparing to build a dock alongside that of the Pennsylvania. The Bayonne and Jersey City Railroad, which connects with the New Jersey Junction Railroad, an extension of the New York Central and West Shore Railways, ends on the Kill von Kull a half mile below the Jersey Central's dock. The Baltimore and Ohio's connection will be completed by the middle of September.

Consul Griffin, at Sydney, New South Wales, in a report on Australian wool and wool growing, says: "There is at present every appearance of a larger wool trade than for the previous year. While the colonial wool product increased between the years 1872 and 1887 from 743,000 to 1,444,000 bales, the amount realized increased only from \$95,820,000 to \$98,300,000. It is estimated that to realize the same amount of money the colonies must now grow 80 per cent. more wool than 15 years ago. The shipments of wool to the United States from Melbourne for the season of 1887-88 amounted to 19,909 bales, compared to 15,360 for 1886-87, and 20,161 for 1885-86. It has been observed that from 1879 to 1887 River Plate and colonial wool increased from 1,500,000 to 2,000,000 bales, or an increase of 500,000; while from 1877 to 1887 the supplies of Australasian, South African, River Plate and United States wool increased from 2,000,000 to 2,700,000 bales, or an increase of 700,000. Yet we find that the con-

sumption has kept pace with the supply. New South Wales alone increased the number of her sheep during the year just closed fully 8,000,000, and the lowest estimate of the increase in the whole of the whole group that I have seen is 12,000,000."

According to the new Domesday Book of England, about two-thirds of the land of England and Wales is held by 10,207 owners, of whom 16 proprietors outside of London were returned in 1873 as either holding more than 50,000 acres, or having estimated rentals of over \$500,000 a year. They were:

	Acres.	Rental.
Duke of Northumberland.....	181,616	\$809,370
Duke of Devonshire.....	126,904	638,165
Sir W. W. Wynn.....	87,526	214,410
Duke of Cleveland.....	81,441	308,220
Earl of Carlisle.....	75,540	248,005
Duke of Bedford.....	74,996	638,265
Earl of Lonsdale.....	67,457	349,795
Earl of Powis.....	60,531	313,470
Duke of Rutland.....	57,082	354,990
Earl of Derby.....	56,471	815,975
Earl of Yarborough.....	55,272	381,190
Lord Leconfield.....	54,615	259,700
Marquis of Ailesbury.....	53,362	290,150
Earl Cawdor.....	51,517	174,935
Sir Lawrence Palk.....	10,109	546,375
Sir J. W. Ramsden.....	8,589	838,005

This table is for England and Wales alone, and it leaves out the Duke of Westminster as being a great landed proprietor of London. The number of owners of land in Great Britain and Ireland, exclusive of London, was officially returned in 1876 as:

	Less than one acre.	More than one acre.	Total.
England and Wales.....	708,289	269,547	977,836
Scotland.....	113,005	19,225	132,230
Ireland.....	36,114	32,614	68,728
Total.....	852,408	321,386	1,173,794

The total number of acres accounted for in the returns is 72,119,882. In England and Wales 874 owners held 9,367,031 acres, or more than one-fourth of the country. Less than 4 per cent. of the population of Scotland, about 5 per cent. in England, and less than 2 per cent. in Ireland, have a share in the ownership of the soil.

Seattle, in Washington Territory, on Puget Sound, is fast filling up with population, most of whom are lumbermen or miners. A good saw-mill hand can command \$4 a day and board. All kinds of permanent business pays just now, and lots fully two miles in the forest are valued at \$500. Enterprising capitalists have driven piles around whole blocks a half mile out in the sound, expecting it to be filled in for building purposes. Seattle claims to have 18,000 inhabitants.

The Italian immigrants in New York City are suffering from destitution, many of them being without employment. The excessive number of arrivals this year is accounted for by the General Manager of the Italian Emigration Society, who says: "Last year 43,725 Italian emigrants landed here. Many of them got work at good wages, and the evidence of their success was presented to those left at home in the tangible shape of cash remittances or in their return to Italy for their families. These facts were taken advantage of by conscienceless scoundrels to encourage an altogether false idea of the conditions of labor here. They stimulated emigration to a most injurious extent. Having fired a poor peasant's mind with visions of a land where work was abundant for all and pay large, they would advance him a passage ticket worth 115 francs and take for it a mortgage upon all his little possessions for 250 francs. They were simply swindlers who cared nothing what became of their victims here so long as they got all that they had in Italy. In this way Italian emigration has been forced up until already by July 1 no less than 38,155 of that class of emigrants had arrived here

this year. Of these nearly all were peasants. There were a few artisans, but probably 90 per cent. at least were agriculturists and common laborers, accustomed to earn from 25 to 40 cents a day in Italy, and to whom the promise of \$1 a day here seemed magnificent."

The value of silks imported at New York during the first half of the year 1888 is \$1,955,202, as compared with \$1,800,000 for the corresponding period in 1884. The imports of silk piece goods steadily diminish year by year, despite the increase of population, while manufacturers of combined silk and cotton fully make up this deficiency.

The Senate Judiciary Committee in Congress responded to the resolution of Mr. Stewart directing them to ascertain whether under the Tariff Act of 1883 lead ore is exempt from duty if it contains gold or silver less in quantity but greater in value than the value of the lead in the ore. The committee express the opinion that under such circumstances lead ore should be exempt from duty, since the silver and gold which predominate are admitted free. A letter from Assistant-Secretary Maynard, taking a similar view, accompanies the report.

Respecting American ware in Austria, United States Consul Jonas, at Prague, says: "This consulate frequently receives inquiries from American commercial and trading firms, as well as manufacturers, touching exports to and imports from the United States, and concerning articles of American origin which could possibly find a market in this country. Different articles sold in this market under an American label and believed by the purchasers to be of genuine American origin, are really nothing but cheap German and British imitations. It may safely be said that numerous articles of our American hardware, mechanics' tools, farming implements and family utensils would find a market in this country if they could be introduced and brought to the notice of the public."

The present condition of the new Croton Aqueduct and the future of the water supply in New York City are subjects incidentally touched upon by General Newton, Commissioner of Public Works, in his testimony before Senator Fassett's investigating committee. General Newton thought the tunnel would be completed in a few months. He estimated the cost of the work at about \$16,000,000. The General said that he expected that the city would be supplied with water as soon as the tunnel was completed, but qualified that statement later by saying that the supply would benefit the citizens as soon as the reservoirs are completed, which he thinks will be in about five years. There will be an abundance of water in five or six years. One reservoir will hold about 9,000,000,000 gallons. The construction of these reservoirs and the dam was opposed by citizens, and therefore the work was greatly delayed. The question whether the Quaker Bridge dam should be a straight dam or a curve had been submitted to three distinguished engineers. Until a decision had been arrived at by them it might be said there would be no plans in existence. He thought \$6,000,000 would cover the expense of the structure. The dam could be constructed safely in six years.

W. H. Vanderbilt's new library building on Thirteenth street, near Eighth avenue, was last week informally presented to the Jackson Square Branch of the New York Free Circulating Library. The building is three stories high and cost \$40,000. The style is Dutch, with a gable. The material of the front is dull red brick with stone and terra-cotta trimmings. The first floor is occupied by the reception-room and

book-cases. On the second floor is the reading-room. The finish of this room is imitation antique oak. A Dutch clock and open fireplace make it homelike. On the third floor the librarian in charge. There are 6000 volumes already on the shelves. Any person of good character, over 12 years of age, will be free to the reading-room or to take away books for a week. There are four libraries of the kind now in the city—the Jackson Square, the Bond Street, the Ottendorfer, on Second avenue, and the Bruce, on West Forty-second street.

The rubber trust has petered out, owing to the unwillingness of a large rubber manufacturer in New Jersey to enter the combination. In January last the rubber manufacturers of New England got together and determined to combine their properties in a trust, which should operate all the rubber shoe concerns in the country. The idea was generally popular, with the exception noted. The Jerseyman finally, in order that the disastrous competition that has been going on for several years should cease, agreed to enter into a combination on prices which should in no way interfere with the individual holdings of the various concerns. It since turns out that the price agreement is in all respects as satisfactory as could have been expected under a trust system, and so far this year at least is likely to remain in force.

Second Assistant Postmaster General Knott has had prepared for the Cincinnati Exposition an artistic chart, illustrative of the development of the postal service in the United States since the establishment of the Government. The carrying service on June 30, 1888, is given as follows:

	Number of routes.	Length of routes, miles.	Number of miles traveled last year.
Railroad service....	1,987	148,007	185,815,082
Steamboat service..	125	10,590	3,162,808
Mail messenger service.....	5,915	4,602	10,632,148
Special office service	2,630	16,709	3,476,213
Star service.....	14,247	226,122	82,322,420
Totals.....	24,904	406,030	284,908,671

The number of miles traveled is over 11,000 times the circumference of the globe. During the last two years the number of railroad routes has been increased by 285, steamboat routes by 9 and Star routes by 1002. The number of miles of railroad service has been increased by 19,074, and the whole number of miles traveled in all branches of the service by 26,120,606.

The New York City Division of the Brotherhood of Locomotive Engineers have voted to assess themselves \$5 each per month, for the benefit of the strikers on the Burlington system.

Commissioner Stephenson, of the State Board of Emigration, who has just returned from a trip West, says there is room enough in America for all the emigrants who may come to our shores. In this respect his opinion has suddenly changed. At the Duluth coal and ore docks men receive 50 cents per hour, or \$5 per day, while farm hands in Dakota get \$2 a day and board, the farmers complaining that they cannot get help enough to get in the wheat harvest.

The Mexican Central freight depot at Paso del Norte was burned a few days ago, entailing a loss of \$500,000. Seventy-two cars were destroyed, 20 of them loaded with mining machinery and valuable merchandise.

Neither General Master Workman Powderly nor President Gompers of the National Federation of Trades is a candidate for the office of Commissioner of Labor. In labor circles it is thought the President will appoint Carroll D. Wright.

MANUFACTURING.

Iron and Steel.

The employees of the Beaver Falls Iron Company, of Beaver Falls, Pa., are on a strike. On receiving their pay recently some of the workers found that their wages had been computed at the rate of \$9.60 per ton, instead of \$10.40, as paid heretofore. The men refused to accept the reduction and stopped work. About 150 men were thrown out of employment.

The Sergeant Mfg. Company, capital stock, \$25,000, have been chartered by B. E. Sergeant, George S. Sergeant and William T. Sergeant, to operate an iron foundry now erected at Greensboro, S. C.

Wm. Swindell & Bros., engineers and contractors, of Pittsburgh, have received a contract from the Passaic Rolling Mill Company, of Paterson, N. J., for three of their improved Siemens regenerative furnaces—one for the bar mill, one for the guide mill, and a double puddling furnace; also a block of four of their improved gas producers and a brick gas flue, 6 feet in diameter, 200 feet long, to carry gas to nine regenerative puddling furnaces and three regenerative heating furnaces.

M. V. Smith, metallurgical engineer, of Pittsburgh, has received an order for a set of drawings and specifications for his improved artificial gas producer, to be sent to Mons. Lucien Arbel, of Rive-de-Gier, France.

Joshua Lancaster, president of the furnace company at Talladega, arrived in that place during the past week from his home at Port Madac, England. A large force of hands is now pushing the work on the company's two furnaces, which are expected to be in operation by the close of summer.

Work on the furnace at Riverside, belonging to the Montgomery Chemical and Furnace Company, is to be resumed. Over \$70,000 has already been expended on this plant. The Louisville and Nashville Railroad Company have offered to buy an interest in this furnace and the furnace people now have the matter under advisement.

Furnace prospectors have been visiting Jacksonville and Crow Plains recently in the interests of new plants at both of these places, and as they are in the center of the finest car-wheel iron region of the State there is every reason for believing that at no distant day companies will be organized and furnaces built in both towns.

The Westerman Iron Rolling Mills, situated on the Fifteen Mile Creek, a mile from Lockport Depot, N. Y., were destroyed by fire 3d inst. The fire caught in the roof from the high chimney about noon, and in 15 minutes the entire mill was burned out so that nothing but the rafters remained. The warehouse to the right was burned, as was also the bridge crossing the creek. The mills were a complete loss, and the fire throws 75 men out of employment. The loss is placed by the firm, composed of George Westerman, Sr., and Calvin G. Suthiff, at \$50,000. There is an insurance of \$8500. In 1881, this same month, the mill was burned in the same manner. The firm state that they will rebuild and be running in 60 days.

The work of enlargement at the car works of the United States Rolling Stock Company, at Anniston, Ala., is progressing steadily. The annex to the machine shop and that to the main building are both completed. In the rolling mill three new furnaces are being erected, and three new hammers are being prepared for their position. Work will begin shortly on the new building proposed, which will be quite an

extensive one, 1500 feet long and 105 feet wide. This building will be used for a wood-working shop, and the machinery for the interior will be propelled by a 500 horse-power engine.

The Sheffield and Birmingham Coal, Iron and Railway Company, of Sheffield, Ala., placed their second furnace in blast a few days ago. The stove works at Sheffield, which were recently put into operation, are now turning out some fine goods, the manufacturers alleging that the iron from the furnaces at that place is the best they ever saw for the manufacture of toves.

Thompson C. Gill & Co., Philadelphia, who purchased the contents of the sheet mills of the Bay State Iron Company, South Boston, have finished dismantling this portion of the plant. They also purchased the puddle mill belonging to the same concern, and they are now at work getting the machinery ready for sale.

It is claimed that the rolling mills now being erected at Jasper, Ala., will be the largest and best equipped in the State.

No. 2 Furnace, of the Coplay Iron Company, Limited, at Coplay, Pa., which has been undergoing repairs for some time, was put in blast last week.

Macungie Furnace, of the Macungie Iron Company, at Macungie, Pa., was blown out on Wednesday, the 27th ult., for the purpose of relining and repairs.

The plant of the Stony Creek Rolling Mill Company, Limited, at Stony Creek, Pa., which has been idle for several weeks, has gone into operation again.

The firm of Hussey, Howe & Co., Limited, steel manufacturers at Pittsburgh, will shortly be dissolved, and an incorporated organization effected. J. W. Brown, who is now secretary and treasurer of the company, will probably be made chairman of the new organization.

The Western Steel Company, of St. Louis, will, it is now definitely known, turn the Vulcan Steel Works over to their owners upon the expiration of their lease. Notice has already been given by the Western company to stop deliveries of coal on a contract calling for 210 tons a day, and not expiring until September 15th next. There is considerable talk, however, of the works being restarted by another company; two different schemes having that object in view are said to be on foot.—*Age of Steel.*

The blast furnace of the Bellaire Nail Works, of Bellaire, Ohio, produced 4350 tons of No. 1 Bessemer pig iron during last month.

For several months past the Glendon Iron Company, Easton, Pa., have been making brick from hot cinders that come from the furnace; recently the wages of the brick-makers were reduced and all of them quit work. The company notified all of their ore contractors in Williams township to stop delivering ore at the works on the 30th inst. It is thought that this means that the company have poor prospects of putting their four idle furnaces in blast.

During the month of June the blast furnace of the Belmont Nail Company, at Wheeling, W. Va., produced 3300 tons of Bessemer pig iron.

The Gogebic Furnace Company, who operated the furnace at Iron River, Mich., in 1887 and part of 1888, has blown out the furnace and given up the lease to the owners, the Iron River Furnace Company, of Fond du Lac, Wis.

The plant of the Columbia Iron and Steel Company, at Uniontown, Pa., is closed down in all departments. These

works have heretofore been operated independent of the Amalgamated Association, although paying the scale of wages demanded by that organization. Last week a committee representing the employees presented the Amalgamated scale to the firm for their signature, and, upon the refusal of the firm to sign the scale, the works were at once closed down. The proprietors state that they are in no hurry to resume operations, as their orders are about all filled and they desire to make some improvements and repairs. From present appearances it will be some time before operations are resumed.

The Scottdale Iron and Steel Company, Limited, at Scottdale, Pa., have signed the Amalgamated scale and the works are now in full operation, giving employment to about 300 men.

The Pittsburgh Steel Casting Company, of Pittsburgh, have recently signed a contract to furnish some heavy castings for the cruiser Maine, now being built by the Government at the Brooklyn Navy Yard. Among the pieces to be cast is the stern-post, which is of such an unusual shape that an examination of the pattern by the railroad officials was necessary before a safe shipment of the casting could be guaranteed. The total cost of the work will be about \$70,000.

The Lukens Rolling Mills, Coatesville, Pa., Chas. Huston & Sons, proprietors, have just put in a new set of three-high rolls, 98 x 30, in place of 84 x 25, as heretofore. They also put a new cylinder of increased size, with Corliss valve gear, to their engine, which was formerly of the slide-valve pattern. All the work is now complete and running satisfactorily. Orders are reported plenty.

In our issue of the 28th ult. we stated that Brown, Bonnell & Co., of Youngstown, Ohio, had issued a notice that upon the resumption of work after repairs all employees not members of the Amalgamated Association would be requested to accept a 10 per cent. reduction. This was an error, the notice in question reading as follows: "In accordance with the receiver's agreement to give notice of any proposed change in wages of tonnage working, notice is hereby given that a reduction in that class of wages will be asked for to take effect on the resumption of work after July 1."

Machinery.

At the annual meeting of the Swinerton Locomotive Driving-Wheel Company, held in Portland, Me., recently, the following officers were elected: Directors, Charles E. Swinerton, J. F. Merrow, Jeremiah Prescott, N. W. Rice, Boston; Frank Jones, Portsmouth; George Burnham, Jr., Portland; George P. Westcott, Portland; J. S. Ricker, Deering; J. Hopkins Smith, New York. President, Charles E. Swinerton. Clerk and treasurer, J. Hopkins Smith.

The Kansas City Foundry and Machine Company, who lately bought out the King Novelty Mfg. Company, of Independence, Mo., have now fully organized, with capital stock \$40,000 paid up; T. B. Ray, president; T. C. Bradley, vice-president and treasurer. They are now building a new brick foundry and machine shop at Manchester, a suburb of Kansas City, and expect to be in active operation by August 1st.

A special dispatch from Altoona, Pa., under date of the 6th inst., reads as follows: "For some time past rumors have been afloat in this city that the Pennsylvania Railroad Company contemplate erecting a number of new shops here. The report has been confirmed, and in a short time work will be commenced. The improvements will consist of a brick paint-

shop 135 feet wide by 480 feet long, with transfer pit. The building will be L-shape, having a capacity for 48 cars and giving employment to about 200 men. A new cabinet shop, 250 x 160 feet, will also be built. The new shops will be erected at Seventh street and Chestnut avenue. A new round-house for the use of the middle division will be built at Fourth street and Eighth avenue. This will relieve the round-house at Twelfth street, which will be converted into a workshop. The statement is made that \$285,000 has been appropriated to meet the expense assumed in the erection of various buildings. A new brick warehouse to cover two squares on Eleventh avenue will also be erected in a short time.

The Midway Machine Works have gotten snugly fixed into their new quarters in South Anniston. The cupola is going up for the foundry and will be ready in a week or so. The brass-foundry room is 50 x 70 feet. The pattern shops are located in the second story and are 30 x 100 feet in dimensions. The company make all of their patterns and do all of their own woodwork. The erecting shop is 50 x 30 feet in size. The company are just finishing a locomotive for the Hidalgo Railway Company, of Mexico.

The Secretary of State of Illinois has licensed the incorporation of the St. Louis Deadlock Brake Company, at East St. Louis, the same to have a capital stock of \$25,000. The incorporators of the company are Nathaniel T. Lane, James V. S. Barrett and A. W. Taussig.

The Kings County Boiler works, formerly of Kent avenue, Brooklyn, N. Y., have removed to the corner of West and Noble streets, same city, being now located in what was formerly known as Greenpoint. The new works, which cover about an acre of ground, are within a block of the river front, which enables them to bid successfully on steamboat jobs. C. F. Davenport is secretary of the company.

The Kilby Mfg. Company are the new corporation who have bought the property, good-will and business of the Prospect Machine and Engine Company, of Cleveland, and of Barney & Kilby, of Sandusky, Ohio. They have made extensive additions to the shops and machinery, and are prepared to do all kinds of heavy foundry and machinist work, besides building the Cummer Automatic and Newert Automatic engines.

The Phoenix Iron Works, Meadville, Pa., engine and boiler builders, use natural gas for steam making; also for blacksmith furnace and for their core oven.

Hardware.

The Freeman Wire Company, of St. Louis, hope to start up the Illinois Wire Mill, which they recently purchased, early in July. In addition to sizes adapted to barb wire manufacture, the company will make other sizes for which there is a local demand, hitherto cared for by outside manufacturers. A very considerable portion of the product will be used in the company's barb wire plant, which immediately adjoins the mill.

P. & F. Corbin, New Britain, Conn., are reported to be building an addition to their factory.

The Universal Horseshoe Machine Company, at a recent meeting, increased their capital stock from \$175,000 to \$300,000. Their buildings at Anniston have been erected, and it will not be long before they will begin operations. They are preparing to make steel blooms themselves in the event of Anniston-Bloomary finding it impossible to keep them fully supplied with the raw material out of which their product is made.

The Iron Age

New York, Thursday, July 12, 1888.

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JOHN S. KING, - - - BUSINESS MANAGER.

The Blast Furnaces on July 1.

The unfavorable conditions affecting the iron trade have had a further effect on the current pig iron production, the coke furnaces notably showing a falling off, in spite of the fact that Alabama has increased and is still adding to her capacity by blowing in new plants. The status of the anthracite furnaces was as follows:

Anthracite Furnaces in Blast July 1.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New York.....	28	10	2,844	18	4,124
New Jersey.....	15	4	1,354	11	3,498
Spiegel.....	3	2	179	1	67
Pennsylvania:					
Lehigh Valley.....	48	25	9,283	21	5,347
Spiegel.....	1	1	50	0	0
Schuylkill Valley.....	36	18	5,734	18	3,658
L. Susquehanna Valley.....	23	11	4,566	12	2,702
Lebanon Valley.....	15	13	5,909	2	540
U. Susquehanna Valley.....	18	8	2,579	10	1,881
Maryland.....	4	0	0	4	462
Total.....	187	92	32,478	95	22,279

As compared with previous months these figures show as follows:

	Furnaces in blast.	Capacity per week.
July 1, 1888.....	92	32,478
June 1.....	99	32,418
May 1.....	96	31,003
April 1.....	94	30,496
March 1.....	96	28,588
February 1.....	97	29,989
January 1.....	118	38,206
December 1, 1887.....	122	39,487
November 1.....	124	40,028
October 1.....	123	39,440
September 1.....	125	38,338
August 1.....	129	37,930
July 1.....	138	40,742
June 1.....	138	44,188

In New York Charlotte went out on the 15th ult. to reline, an operation which it is expected will be finished in the beginning of September. Kirkland is about to resume, if in fact it is not already blowing as we go to press. In New Jersey Chester is banked, leaving only Franklin, Oxford, Secaucus and Warren at work, all the others being idle. The New Jersey Zinc Company are running one stack, and the Passaic one, on spiegeleisen. In the Lehigh Valley Bethlehem has six in blast, Crane four, Glendon only one, and the Thomas Company ten. The latter company has been doing excellent work of late, the weekly output being over 3500 tons. The one furnace of the Allentown Rolling Mill Company, which was blown out for repairs some time since, is now nearly ready to resume. Then the one now running, which is about worn out, will go out, and will probably remain idle during the balance of the year, unless an improvement in the demand warrants starting up. Macungie is now idle, and it is not the intention to make repairs until indications of a better trade are manifest.

In the Schuylkill Valley both the Merion and the Elizabeth are idle and Mount

Laurel went out of blast for repairs on the 1st inst. Swede resumed operations during June. In the Upper Susquehanna Marshall went out in the middle of last month for repairs which will take four months. If the market is favorable the plant will be put in operation then. In the Lower Susquehanna Valley one of the Chickies furnaces is idle for repairs and Katherine, too, is out, to resume on about the 1st of August. No. 1 Paxton, which has been ready to blow in for a long time, remains cold, and it is doubtful even whether No. 2, now producing, will long go on running at present prices. In the Lebanon Valley Robeson resumed on the 28th ult.

We give below the status of the coke furnaces:

Bituminous and Coke Furnaces in Blast July 1.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New York.....	8	1	984	7	1,900
Pennsylvania:					
Pittsburgh district.....	19	15	14,555	4	2,925
Spiegel.....	1	1	341	0	0
Shenango Valley.....	20	12	6,901	8	4,169
Juniata and Conemaugh.....	21	12	5,483	9	3,320
Spiegel.....	1	1	0	0	200
Youghl. Valley.....	3	3	1,142	0	878
Miscellaneous.....	1	1	519	0	945
Maryland.....	0	0	0	0	320
Virginia.....	11	7	3,177	4	2,115
West Virginia.....	6	1	746	5	2,046
Kentucky.....	4	4	1,076	0	0
Ohio:					
Mahoning Valley.....	13	6	4,645	7	4,007
Hanging Rock.....	11	9	1,985	2	423
Hocking Valley.....	14	4	1,165	10	2,128
Central and Northern.....	17	7	5,397	10	5,144
Illinois.....	15	7	7,232	8	7,694
Missouri.....	9	2	962	7	2,740
Wisconsin.....	4	2	926	2	1,176
Indiana.....	1	1	174	0	240
Michigan.....	1	0	0	1	250
Alabama.....	18	14	7,427	4	1,964
Tennessee.....	10	9	3,959	1	540
Georgia.....	1	2	805	0	0
Colorado.....	1	1	462	0	0
Total.....	212	121	69,463	91	45,222

As compared with previous months these figures stand:

	No. of furnaces.	Capacity per week.
July 1, 1888.....	121	69,463
June 1.....	128	75,427
May 1.....	130	75,815
April 1.....	123	70,644
March 1.....	123	68,892
February 1.....	136	73,912
January 1, 1888.....	143	83,101
December 1, 1887.....	144	88,835
November 1.....	151	90,459
October 1.....	152	89,123
September 1.....	145	83,124
August 1.....	113	62,061
July 1.....	98	47,319

In New York only one of the Troy furnaces is now running. In the Shenango Valley there have been no changes during June, the same being true of the Juniata and Conemaugh districts and the Youghiogheny. Among those grouped as miscellaneous we may note that Centre Furnace is repairing, and is expected to begin work again early in August.

In the Pittsburgh district furnace D of the Edgar Thomson plant was blown in on June 30, so that all the nine furnaces of Carnegie Bros. & Co. are now at work, this firm making now more than one-half of the iron produced in Allegheny County. Edith Furnace stopped on the 16th ult. for relining, and Isabella No. 1 went out for a similar reason, to resume probably during the current month.

In Virginia Gem is likely to remain inactive until the company is reorganized. Lynchburg expects to have repairs completed by the 1st of August, and Pulaski

started in again on the 27th ult. after an idleness of less than a month. The new furnace of the Virginia Nail and Iron Works made its first cast in June. In West Virginia Belmont is now the only stack in operation, both Riverside and Top Mill furnaces being out of blast for relining.

In the Mahoning Valley Falcon was banked on the 21st ult. and Phoenix on the 26th. Anna is to blow in during the current month, after being thoroughly repaired, and Mary is also likely to resume early in August. Among the stacks of Central and Northern Ohio the noteworthy changes are the blowing out of Dover, Franklin and Zanesville. The latter was temporarily banked on the 16th ult., and later on stopped to clean out the stoves. It is to resume in two weeks. Steubenville Furnace, on the other hand, resumed during June. Belaire has already attained the record of making over 80,000 tons of pig iron on one lining, and is expected to run a year longer on it. In the Hocking Valley Crafts has just completed a new hearth and bosh, but it will only light up when prices warrant it. Gore went out on the 23d. ult. In Illinois South Chicago is running only one stack. In Missouri Jupiter went out on the 28th ult., and the only furnace of the Western Steel Company now active is expected to stop about the middle of this month. This will leave only one coke stack at work in the State. In Wisconsin the remodeled Mayville, formerly a charcoal stack, started on coke on the 28th ult.

In Alabama No. 1 Eureka resumed on the 25th, and No. 2 on the 29th ult., both having been banked since the 21st of May on account of a shortage of coke. One of the Sloss furnaces was blown in early in July. One of the new De Bardeleben furnaces, at Bessemer, made its first cast on the 13th ult., and one of the new Sheffield and Birmingham Company's stacks blew in during the month, the second following early this month. Two Ensley furnaces are now at work. Gadsden is expected to begin blowing in the middle of August. In Tennessee South Pittsburgh has two stacks out of three in operation.

The status of the charcoal furnaces was as follows:

Charcoal Furnaces in Blast July 1.

Location of furnaces.	Total number of furnaces.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New England.....	14	5	410	9	680
New York.....	10	3	572	7	563
Pennsylvania.....	23	4	295	19	755
Maryland.....	13	4	369	9	580
Virginia.....	23	5	247	18	755
West Virginia.....	3	0	0	3	165
Ohio.....	18	8	631	10	649
Kentucky.....	2	2	215	0	0
North Carolina.....	2	1	90	1	80
Tennessee.....	10	5	1,270	5	1,080
Georgia.....	2	0	0	2	114
Alabama.....	10	10	1,921	0	0
Michigan.....	25	11	3,528	14	2,215
Minnesota.....	1	0	0	1	230
Missouri.....	4	2	623	2	320
Wisconsin.....	11	4	822	7	1,070
Texas.....	1	1	178	0	0
California.....	1	0	0	1	230
Washington Ter.....	1	0	0	1	175
Oregon.....	1	0	0	1	125
Total.....	175	65	11,169	110	9,776
June 1.....	177	63	10,972	114	10,499

Among the charcoal iron enterprises we may note the following: In New England

Kent is still idle; the repairs being made are expected to be completed in September. In Virginia Beverly, Cedar Run, Foster's Falls, Reed Island and Speedwell are producing iron. In the Hanging Rock region Jefferson and Madison have blown in. In Michigan Deer Lake resumed in June, while Spring Lake stopped for repairs on June 25, with the expectation of blowing in again early in August. In Wisconsin Hinkle is out, but will soon start again. Minneapolis Furnace made 8510 tons during the first six months, in spite of constant shortage of charcoal. Otherwise the furnace would have exceeded the nominal capacity and would have come up to 65 to 70 tons a day. The Minneapolis iron is now being used alone in car-wheels, with reported satisfactory results. In Missouri Sligo is again running. In Tennessee Cumberland Furnace blew out on the 1st ult., and will not run again until railroad transportation is secured, which, it is hoped, can be obtained within a year. In Alabama Rock Run is to go out in August for 30 to 60 days to make repairs. The furnace had a 14 months' blast on one hearth. Both Shelby, both Woodstock, Tecumseh and Gadsden are producing.

Irontale Furnace, of the Puget Sound Iron Company, is to go into blast between the 15th and 20th of July, after thorough repairs, the erection of charcoal kilns, &c. It is expected that the furnace will make 40 tons of charcoal iron per day. The Oregon Iron and Steel Company, of Oswego, Ore., are building a new furnace, which will blow in early in August. It is 60 x 13, with three Whitwell stoves.

Little significance attaches to the statements of furnace capacity idle, because they naturally lump together plants so long inactive that under conditions like the present they seem to have little chance of early resumption. Until a furnace is either abandoned or dismantled it is naturally carried along in the lists, although under normal conditions it is not worthy of being considered reserve capacity. It has been thought a matter of interest to segregate these plants from those which are really on the active list, being merely out for repairs or temporarily banked. We have grouped together all the furnaces which have been idle for six months or more to show how large a capacity is practically out of the race when the markets are at or near low level. We have included furnaces held in reserve often practically as "alternate stacks," that is to say, such as are kept in readiness to enable continuous work to be done, the machinery available being only powerful enough to run one furnace.

Analysis of Idle Anthracite Furnaces.

	Out six months or more.		Temporarily idle.	
	Num-ber.	capac-ity.	Num-ber.	capac-ity.
New York.....	12	2,586	4	1,188
New Jersey.....	9	2,781	3	784
Pennsylvania:				
Lehigh Valley.....	15	3,210	6	2,137
Schuylkill Valley....	14	2,314	4	1,344
Lower Susquehanna	9	1,821	3	781
Lebanon Valley.....	1	190	1	350
Upper Susquehanna	8	1,418	2	403
Maryland.....	4	462	..	....
Totals.....	72	15,232	23	7,047

It will be seen, therefore, that the furnace capacity which is likely to be made available by a moderate revival is very small indeed, while that part of it which cannot be counted upon to aid in output

unless a heavy advance takes place is relatively large. It may be stated in this connection that the latter is largely nominal since our records do not contain data which would allow us to gauge their possible make from actual output over any extended period.

Similarly the coke furnaces show the following when segregated into two groups:

Analysis of Idle Coke Furnaces.

	Out six months or more.		Idle temporarily.	
	Number.	Capacity.	Number.	Capacity.
New York.....	2	1,900	..	....
Pennsylvania:				
Pittsburgh district.....	1	350	3	2,855
Shenango Valley.....	4	2,040	4	2,129
Juniata and Conemaugh..	2	2,452	3	1,068
Yough Valley.....	2	976	..	....
Miscellaneous.....	..	..	2	945
Maryland.....	..	..	2	320
Virginia.....	2	1,431	2	684
West Virginia.....	2	392	3	1,854
Ohio, Central and Northern	4	1,828	6	3,316
Mahoning Valley.....	..	..	7	4,007
Hocking Valley.....	6	1,259	4	809
Hanging Rock.....	1	300	1	123
Illinois.....	4	2,088	4	5,806
Missouri.....	5	1,985	1	755
Wisconsin.....	2	1,176	..	....
Michigan and Indiana.....	2	490	..	....
Alabama.....	2	880	2	1,084
Tennessee.....	..	..	1	540
Total.....	46	19,784	45	25,067

It will be noted that in the case of the coke furnaces the available reserve is a far heavier proportion of the total capacity idle.

The Advance in Tin.

The statistics for the month of May were a disappointment to holders of tin and speculators for a rise, so much so that the metal was left to its own fate during the first three weeks of June, dropping all the way to £76. 5/. On June 1 the visible supply in Europe and America was 23,516 tons, as compared with 20,194 on May 1, showing an increase of 3322 tons where a decrease was expected. On July 1 the figures had radically changed, the visible supply being 20,403 tons, or 3113 tons less than the month before. On July 1, 1887, it was 16,092, and on July 1, 1886, 10,871. The deliveries more particularly attracted attention, being no less than 4268 tons in England and Holland in June, against 1999 in June last year and 1835 in June, 1886.

We perceive from our Continental exchanges that on or about June 24, when tin was at its lowest in London, the general opinion prevailed that the syndicate, after having accomplished its object of helping to depress the market, was about to come to the rescue of the downtrodden metal, a thing which has since taken place, the syndicate still being the heaviest holders, owning, it is asserted, some 16,000 tons. Considering that prior to the boom last year tin ranged in London during a twelvemonth between £90 and £100, and was not looked upon as too dear for ordinary purposes of consumption, it was evident that it must be cheap at £76. 5/, provided there was no fear that the syndicate would soon come to grief. Added to the cheapness there was the fact that, at the Straits at least, the low price was beginning to curtail production, and people in the tin trade at Singapore and Penang, especially the large Chinese traders, were thinking well of the metal and its im-

mediate future. After the tumble the Chinese were free buyers at the low prices then prevailing at Penang, and remained purchasers to ten times the amount bought for Europe and America. Besides what they bought they shipped to China their speculative holdings since the beginning of the year. While so low tin received more support from the Chinese firms in the Straits than from Europeans and Americans outside of the syndicate, and in this they have displayed their usual foresight as merchants.

The rebound, when it came, carried tin £10 higher in about a week in London, and 2 cents in New York, although it has since again receded to some extent. London predictions per cable that the syndicate is about to collapse are heeded very little on this side, because we are fully aware that they are dictated on the one hand by ill will and on the other by interested motives. Although none but the copper companies on this side are admirers of the syndicate, we are far from believing that its downfall is near at hand. We, therefore, hold that the present reaction in favor of tin is from every point of view legitimate, and likely to remain so, unless prices are again driven to extremes, as they were in January, February and March.

The Chicago *Tribune* selected the 4th of July for the publication of a very erroneous article on the condition of the steel trade of that locality. The article would have attracted little attention if it had appeared in an obscure paper, but the *Tribune* has such a high standing and circulates so widely that any statement appearing in its columns seems naturally to be at once stamped as authentic. In this article several truths are stated, but they are buried in a mass of misstatements so completely that columns would be required to correct all the false impressions conveyed. A few of the most important errors, however, ought to be pointed out. The Chicago steel men are not all going ahead and making money. The past two months and this month they have been able to run somewhat steadily through the accumulation of a number of small orders for rails for summer delivery, but they are not, as stated, "turning out more rails" this year than last. One steel rail mill is not making any rails at all and has not done so for months, but it ran all last year. The other mills have also fallen far short of last year's production up to this time. The article says that the mills "are now able to turn out steel rails at least \$5 cheaper than they could last year, consequently at \$32 per ton this year they are making just as much as they were last year at \$37." The grounds upon which this statement is made are not given, and it is rather seriously doubted, for reasons which it is unnecessary to lay before our readers who are familiar with the cost of manufacturing iron and steel. The details of quantity of material used in manufacturing a ton of steel rails are altogether wrong, but they show that the writer has been somewhat diligent in the use of such information on the subject as he could get ready made, and which he supposed gave him all that was needed. It is very distracting to Chicago manufacturers and business men, who are anxious to have their daily papers pay more attention to the business and in-

dustrial topics, to find these questions treated with such gross misunderstanding when they are taken up.

Six Months' Pig Iron Production.

We present below an estimate of the pig iron production in the United States for the first six months of the current year, based upon full, but not complete, returns. However, nearly every large producer in the United States favors us with official returns, the figures in a number of districts being the aggregates of the product of every maker, large or small.

As will be seen, the output of anthracite pig fell off heavily, a result partly due to the coal strike, but more largely to the decline in prices.

Production of Anthracite Pig Iron, Gross Tons.

	First half 1887.	Second half 1887.	First half 1888.
New York.....	103,800	90,472	77,166
New Jersey.....	95,408	58,658	46,244
Pennsylvania:			
Lehigh Valley...	384,070	311,411	250,191
Schuylkill Valley...	231,490	233,125	153,584
Upper Susquehanna Valley...	80,010	67,388	70,963
Lower Susquehanna Valley...	220,583	244,933	96,461
Lebanon Valley...			147,860
Maryland.....	7,355	9,188	776
Total.....	1,072,718	1,015,125	843,275

The figures for 1887 are the returns of the American Iron and Steel Association. It should be stated, however, that our grouping is somewhat different. We set aside the Lebanon Valley, including in it three furnaces which Mr. James M. Swank classifies with the Schuylkill Valley.

Our returns for the coke furnaces show the following:

Production of Bituminous Coal and Coke Pig, Gross tons.

	First half 1887.	Second half 1887.	First half 1888.
Pennsylvania:			
Pittsburgh district.....	333,820	468,030	321,525
Shenango Valley.....	157,952	207,318	184,373
Juniata and Conemaugh.....	199,757	191,915	144,758
Youghiogheny.....			25,815
Miscellaneous.....			20,841
Total Pennsylvania.....	691,329	867,263	697,312
New York.....	6,562	40,309	12,711
Southern States:			
Maryland.....	2,232	893	
Virginia.....	70,926	77,519	82,069
Georgia.....	21,441	15,208	20,859
Alabama.....	63,770	92,002	121,087
Tennessee.....	90,658	91,291	86,290
Kentucky.....	21,623	10,257	19,468
West Virginia.....	29,071	44,421	42,528
Total Southern States.....	320,021	332,191	372,310
Ohio:			
Hanging Rock.....	57,723	55,211	54,023
Mahoning Valley.....	150,784	174,427	186,548
Hocking Valley.....	30,979	24,667	41,423
Central and Northern.....	164,866	195,812	189,297
Total Ohio.....	404,342	450,117	471,290
Indiana.....	7,776	4,019	7,229
Illinois.....	224,255	271,685	262,967
Wisconsin.....	37,844	38,928	19,482
Missouri.....	39,976	47,428	46,991
Colorado.....	11,753	10,828	11,000
Grand total....	1,743,670	2,063,796	1,901,281

The heavy outputs early in the year to a large extent will compensate for the decline in the later months, the total falling-off as compared with the second half of 1887 being only 162,000 tons. The South has gained—our figures, however, not being as complete as is desirable for Alabama. Pennsylvania has fallen off—the

Pittsburgh district chiefly, on account of the stoppage at the Edgar Thomson works. Ohio gained a little, while Illinois fell off a trifle.

Production of Charcoal Pig, Gross Tons.

	First half 1887.	Second half 1887.	First half 1888.
New England.....	17,882	16,378	13,680
New York.....	12,858	10,973	8,798
Pennsylvania.....	3,667	6,966	5,373
Maryland.....	5,704	8,094	3,851
Virginia.....	2,084	6,358	2,035
North Carolina.....	1,250	2,000	1,200
Alabama.....	49,842	42,078	39,130
Tennessee.....	15,804	25,267	27,768
Kentucky.....	622	4,915	1,344
Texas.....	1,719	2,191	2,991
Ohio.....	5,157	11,400	8,459
Michigan.....	85,219	105,426	99,731
Wisconsin.....	19,993	22,438	20,466
Missouri.....	9,937	16,448	10,999
Washington Ter.....	1,416	.....	.....
Total.....	235,354	281,032	239,615

There has, therefore, been quite a notable falling off in the production of charcoal iron.

Summarizing the whole, the make of pig iron for the last six months was 2,984,177 gross tons.

Terms of Payment on Pig Iron.

A Consensus of Opinion.

Lately considerable difference of opinion has developed in one of the leading iron markets of the country over the two questions stated below. In order to ascertain how far these differences of opinion extended, and what is the practice in different sections of the country, we addressed a letter of inquiry to the leading pig iron merchants throughout the country, whose replies we append. The questions under discussion were:

1. Does four months' time on pig iron mean from date of shipment or date of receipt of the iron?
 2. If cash discount is taken, is it taken from the date of the furnace shipment or from the date of the receipt of the metal?
- Grouping the replies by the leading markets we have:

NEW YORK.

Warren, Wood & Co.: We understand four months' time on pig iron means four months from the time the iron arrives at the agreed point of delivery. If sold at a stated price at furnace, to date from shipment. If sold delivered on buyer's dock, to date from delivery on buyer's dock. With regard to cash discount the same rule applies—i. e., to discount from the time delivery is made as contracted, either at furnace or on buyer's dock.

Hugh W. Adams & Co.: To your first question we answer, four months' time on pig iron means to date as per terms of contract; sometimes from date of shipment from furnace; sometimes from date of shipment from tidewater, and sometimes from date of receipt of the iron at consumers' works. To your second question we answer, a cash discount would also depend upon the terms of the contract, as stated above in regard to time.

PHILADELPHIA.

L. & R. Wister & Co.: In reply to your first question we would say that the usual custom is to sell the iron delivered to works. We consider the date of the receipt of the iron the commencement of the time sold on. Second, there is very little iron sold in the Eastern market subject to a cash discount, and the receipt of the iron is the basis of settlement.

Another leading Philadelphia firm writes: The answer to the questions you ask depends entirely under on the standing with

parties. If nothing is said about extra time, four months would be from date of shipment if made f.o.b. cars, or if sold delivered from time of receipt by consignee. Mostly 30 days are taken without interest and three months' interest added, unless sold at four months flat, when note would be dated as stated above. The same rule applies to cash payment, whether iron is sold at furnace or delivered. As a general rule customers take the date of receipt as the date for payments.

Justice Cox, Jr., & Co.: An answer to your first question, "Does four months' time on pig iron mean from date of shipment or date of receipt of the iron?" depends very much upon where the iron is shipped from. If from the South, when it takes from ten days to two weeks to arrive at its destination, notes are always dated from the reception of the iron. If it comes from near-by places notes are always dated from the date of the bill, which is always the date of shipment from the furnace. To your second question, "If cash discount is taken, is it taken from the date of the furnace shipment or from the date of the receipt of the metal?" the same rule would answer this as in reference to notes. This is our experience, and we think is the general rule.

J. Tatnall Lea & Co.: In our opinion four months' time on pig iron dates from time of shipment from furnace, if the iron is sold delivered at furnace, or if sold delivered at buyers' works, the time granted, whatever its duration might be, would naturally date from time of its receipt by buyer. This has been our universal experience in the matter referred to, and we have never even heard the question raised. As for cash accounts, they would, of course, be governed by the same rule and date from delivery of metal at agreed point of delivery, at furnace or at buyer's works, as the case might be, but we think where cash discount is contemplated it is most frequently a matter of specific agreement between seller and buyer and is not left to be determined by the application of any general rule or custom.

BALTIMORE.

R. C. Hoffmann & Co.: In both cases it would depend on the terms of sale as to delivery. If the terms be delivery at furnace, or place where the iron is at time of sale, then the note should be from date of sale or shipment, and in case of discount the same. If sold to be delivered at any point other than furnace, or where the iron is when sold, the date in both cases would be the date of receipt of the goods at that point by purchaser. We have known of cases when iron was sold, delivered at furnace, and not moved by purchasers for many months.

J. L. Hogan & Co. say: Pig iron sold on four months' time should be paid for in four months from date of invoice, which should correspond with date of shipment. Should buyers desire to pay prompt cash, and thus avail themselves of discount, the full number of days should be allowed from date of invoice. It may be necessary to qualify the above statement to some extent. For instance, the question might be brought up whether the material was purchased upon a price f.o.b. at furnace or delivered to buyer. If the latter, we have known instances in which the date of arrival was assumed as the basis of settlement. Again, unusual delays sometimes occur in transit, and here again buyers occasionally make claims for consideration. Such cases, we consider, must be settled on their individual merits, without reference to the broad principle as stated above.

BOSTON.

C. L. Pierson & Co.: When pig iron is sold for delivery f.o.b. furnace at shipping port, then four months should be

from date of such delivery. If the iron is sold for delivery at place of consumption or other designated distant point, then four months should be from time of arrival at such designated point, and the same rule should be applied to cash discounts.

CLEVELAND

A leading firm writes: "It is our custom to have the four months' time on pig iron date from the time of shipment from the furnace. Very frequently, however, bright purchasers insist on this being dated from the time of receipt of the iron, in which event we do not care to oppose them. However, we might say that our universal custom is to have it dated from the date of shipment from the furnace. The cash discount is treated in the same way.

Condit, Fuller & Co.: Our understanding of the point referred to is, four months' note from date of shipment from the furnace, or if cash discount is taken it is from the date of shipment, also from the furnace. We invariably require settlements in this way, although frequently customers will try to take advantage of the fact that sales are made f.o.b. at point of delivery, and construe this to mean that settlements are to date from such delivery. We invariably insist on settlements being made from date of shipment, and understand that delivery affects price and not the settlement.

A prominent firm writes: It has become almost a universal custom among sellers of Western irons to make prices delivered at the consumer's city; therefore we take it that four months' time or cash discount should be figured from the date of the arrival of the iron rather than from the date of shipment from the furnace.

CINCINNATI.

Bacon, Floto & Co.: When sales are made on time for delivery at a given point the terms date from delivery at that point, unless specially stipulated to the contrary. In order to secure terms to date from time of shipment sales should be made f.o.b. cars at furnaces, or specially stipulated if price is made away from furnace. Cash discounts will always have to be in accord with the terms of sale. In this market the usual discount is from 40 to 50 cents per ton on four months' sales, remittances to be made within 30 days of receipt or shipment, as the case may be. Prompt cash discounts are specially stipulated. The above are the present usages of this market. We have understood some agencies contending that when they make sales at points of deliveries they make it their rule to date paper from time of shipments; unless this was agreed upon mutually we think it could not be enforced.

Another Cincinnati house holds the following views: Four months' time on pig iron means four months from date of shipment, unless otherwise specified in contract. If cash discount is taken, if at specified rate per cent. per annum, it is right to calculate from date of shipment. If at specified amount per ton, discount must be taken advantage of within 15 days from date of shipment, except in cases where buyer is too far from furnace to receive the iron in 15 days from date of shipment; then 20 days may be allowed. To avoid any misunderstanding between buyer and seller we think the sale memorandums or contracts should distinctly state when papers should date and how cash discount settlement should be made, and we endeavor to cover all these points in our contracts.

PITTSBURGH.

A. H. Childs.: In this market settlements by note for pig iron sold on four months' time are understood to date from the average delivery of the metal to the buyer. If a cash discount is taken on a

sale based on four months' price it usually means 2 per cent. off the face of the bills, which may be rendered for any part of the total amount sold or after all has been delivered, just as may have been agreed upon beforehand.

Collord & McKeefrey: Four months' time on pig iron, in our judgment, means from date of shipment of the iron. Our customers usually make settlements on this basis. Cash discounts should be taken from date of the receipt of the iron.

Nimick & Co.: Unless otherwise agreed in the terms of sale, four months' time on pig iron dates from the receipt of the iron, and cash discount is taken from the date of the receipt of the metal.

CHICAGO.

Pickands, Brown & Co.: On time sales we have three methods—viz.: Four months from date of shipment from furnace or agreed point of shipment. Four months from arrival of the cars at point of delivery. Four months from delivery in the yard or at the works of the buyer. Each method is settled at the time of sale. On cash sales we have two methods—viz.: Sharp cash, which is immediately on arrival at point of destination. Cash 30 days, which is cash within 30 days of arrival at destination. In both cases a delivery at point of destination is made before payment is due unless specially agreed to contrary at the time of sale.

H. R. Durkee & Co.: Replying to your inquiry as to how our customers interpret the expression "terms four months," would say that the general practice in our trade is to regard it as meaning "freight cash; balance four months from date of delivery at place of delivery." Invoices are made out at date of shipment and sent customers as notices of shipment. When the iron is sold f.o.b. at furnaces then the date of the settlement paper coincides with the date of the invoice. When sold f.o.b. at the place of consumption, the paper is dated the day the iron arrives there. When customers buy a round lot of iron, scattered deliveries, receiving a certain number of cars per month, they usually make the paper in one piece for each month's deliveries, and date it at an average date of delivery for the month; the intention being to come as near as possible to paying for the iron four months from the date of delivery, at the place where in the contract of purchase it was agreed to be delivered.

Charles Himrod & Co.: If sold on four months' time, for delivery on cars at the furnace, the four months should begin the day it is shipped; if sold on same terms, delivered at the purchaser's place of business, the time should begin from the date of such delivery. If sold for cash, we consider it monthly settlements; all iron shipped during one month being paid for from the 10th to the 20th of the succeeding month.

The Andrews Brothers Company: We have been asked to give you our views on the terms of pig iron sales. We find some buyers here and elsewhere who insist on four months from arrival of car at destination, and say they get it and refuse to settle otherwise. To avoid any dispute over such a matter we make our quotations read about as follows: "Terms—all freights paid by consignee. Metal, four months' note or acceptance from day of shipment. Cash discount of 50 cents per gross ton on prompt receipt of metal at destination." We find a few buyers who claim that the cash discount can be taken any time in 30 days, but the great bulk of our settlements are made as per our terms given above.

Mrs. David Thomas, the widow of David Thomas, who succeeded in utilizing anthracite as a blast furnace fuel, died on the 9th inst., at the age of 94 years.

THE PIPE TRADE.

Manufacturers' Views of the Situation.

For many months the wrought-iron pipe trade has been in an exceptionally depressed condition. The causes of this deplorable state of affairs are touched upon by the writers of the following communications, who, as manufacturers, have closely watched developments.

A prominent Eastern manufacturer presents the following views:

The demand for consumption is good, and there are many quite extensive orders in the market. We think a larger quantity of iron pipe is being used than usual. The position of the wrought-iron pipe trade is simply that of overproduction. You ask, "To what extent the decline in raw material compensated the lowering of prices." Prices first fell, and the price of raw material followed the decline. Prices, of course, fell faster than raw material, but the difference has not been great. A large business can be done in wrought-iron pipe if present prices could be accepted, but such a business would net a decided loss. You might ask the percentage of loss, which would be difficult to give, as it would vary greatly with the economy with which business was conducted, but, we think, in no case can a loss be prevented at this time. In the year 1886 there was a period of six or eight months that the wrought-iron pipe trade showed a good profit. There is so much capital now lying idle in our country, the holders of which are very keen to employ profitably, that these few months of profit suggested the erection of a number of new mills, located in different parts of the country, mostly in the central valleys and gas districts. These mills have been completed within the past year; some of them are working, and all are in working order. All are anxious to sell their production, and the consequence is an overproduction and glut in the market. Had no new mills been built since the summer of 1885 those in operation at that time would now be transacting a reasonably profitable business, and the production from them would be more than ample to supply our home trade, with a margin for export. If all the mills at present going continue in operation, the rule, "the survival of the fittest" would sooner or later compel some to stop. The other chance for an improvement is to patiently wait until the population of the country grows up to the present capacity of the mills to manufacture pipe. The tariff has nothing whatever to do with the depression in the wrought-iron trade; it is simply overproduction, first, of wrought-iron pipe, and, secondly, of merchandise.

A second Eastern producer states his ideas on the subject:

We believe that the present depression in the iron trade took its origin from the date of the President's unwise tariff proclamation, followed up by the labor strikes, a very severe winter, late spring, and a continuation of the tariff agitation. Prices at this time are running at and below the cost of production. In our opinion, nothing is wanted to bring on a change for the better, except confidence based upon the settlement of the tariff question. It is the suspense created by the agitation of the tariff question that does all the mischief. The Mills bill or any other moderate bill would not hurt the country seriously for 30 days after it was enacted into a law. This country could even stand free trade, though we believe it would bring about a deplorable condition of the toiling millions of this country, that would be deprecated by every honest man in the land.

One of the largest works of the country takes the following position:

Concerning a comparison of the decline in raw material to the decline in the price of pipe, I would state that since January, 1887, the price of small and large pipe has declined, respectively, about 20 per cent. and 25 per cent., while the price of the iron to make these two classes of pipe has declined, respectively, about 10 per cent. and 15 per cent. The price of labor has declined from 6 per cent. to 15 per cent., according to locality. Manufacturers in the East have been able to obtain a larger consideration and co-operation from their workmen than those in the West have. About Pittsburgh the reduction in labor has not averaged over 7½ per cent. The consumption has fallen off notably in natural gas line pipe and natural gas distribution pipe. The dealers throughout the country, owing to the falling market, have bought only from hand to mouth, and the large orders usually placed by this

class of trade in the spring and early summer have not been forthcoming. The stocks, therefore, in the hands of dealers are not as great as they usually are, and, while I look upon the state of affairs as extremely distressing to a manufacturer, still I do not see anything in them to indicate a panic, unless the tariff tinkering or a reduction in the tariff, should increase the timidity on the part of all classes of buyers. Owing to this tinkering, and owing to the depressed and falling market, dealers have held off. Enterprises which were planned have been procrastinated, because every week the enterprise could be floated for 5 per cent. less money than they could the week before. This has retarded many gas plants, water-works plants, and, I believe, a good deal of building. Another thing must be borne in mind. Before the natural gas boom, which created such a demand for wrought-iron pipe, the entire business of this country was being taken care of by seven or eight active mills. There are now about 22 on the list, and, notwithstanding this large increase in number, many of the older ones largely increased their capacity. It is safe to say that there is 30 per cent. surplus pipe machinery in the United States. During the past six months there have been three failures of pipe mills, owing to loss of money, and there have been seven or eight mills shut down, owing to the inability to compete. Only those whose facilities and geographical location, and some, I am sorry to say, who are forced to run for financial reasons, are now in operation.

A Western maker writes ;

There is more real downright cussedness in the pipe business than in any line that we know of. If Congress would enact a law indicating the standard weight of pipe for use for steam, water or gas, so that when buyers receive stuff 10 to 20 per cent. light they could sue the mill producing and recover a proper rebate, it would go a long way toward preventing such foolish cutting of prices as we now see, as to-day, there being no legal standard, each mill does pretty much as it sees fit, and where necessary, in order to save themselves from loss, will cut the weight, as indicated above. Scrupulous manufacturers will not do so, and are consequently driven out of business until the market takes a turn upward again. Raw material has been reduced, say, \$2 per ton, as against a reduction of, say, \$14 per ton on 1-inch pipe (other sizes will figure about the same). The large demand a year ago was from natural gas companies. This has nearly ceased, and there is no prospect of recovery for some time to come. We know of no movement on foot to better the condition, and, from past experience, should take no stock in any offered.

From another prominent manufacturer we have the following :

The causes of the depressed condition of the pipe trade are well known to every manufacturer of the goods. No practical plan looking to a speedy improvement in the situation has, however, in our opinion any chance for serious consideration now, as such a plan would demand from each manufacturer sacrifices that some of them could not, we are satisfied, afford to make.

From another manufacturer in Pennsylvania we have the following :

There has been no decline in raw material to compensate for the low price of pipe, except a slight reduction in wages. The consumption has fallen off in gas-line pipes, as at almost all the points in the natural gas regions the pipes have been laid to the consumers' works. Of course to private houses there will be always new ones, but they will be small pipes. Some of the manufacturers of pipe think the business will revive in October, though why it should we cannot tell. There has been no plan proposed to bring about a better condition of the trade, except one—a suspension of production totally or one half until the consumption catches up with the production. The whole trouble with the pipe trade is that there is too much made and the market is glutted, and parties that have large stocks must sell at such prices as they can get in order to keep their mills running full, as, by running full, they can make pipe at a lower price. The reason for all this is that when the oil and afterward the natural gas was discovered it was necessary to convey it by pipes to the consumers and the oil and gas companies all wanted their pipe as soon as possible, and, as the make of these sizes was limited, a great many pipe manufacturers erected new mills for this large pipe, and others added more furnaces and neglected making small pipe, as gas and oil line paid them better. This made some pipe scarce and started up more mills, among which are the Continental Tube Company, Duquesne Tube Company, J. W. Friend & Co. and Pittsburgh Tube Works, all of Pittsburgh; Tyler Tube Company, of Boston; Oil City Tube Company, Oil City;

American Tube Company, of Youngstown; Warren Tube Company, Warren, Pa.; Riverside Iron Works, Wheeling, Va., and Conshohocken Tube Company, Conshohocken, Pa. Also a new mill at Reading, by the Reading Iron Works, costing over \$100,000; Haxtun Steam Heating Company, Kewanee, Ill., thus making 29 mills in the United States, when there were only 17 or 18 before. Some of these are not running at present, as pipe is selling below the cost of making, but should the price increase they would all start up in a few days and of course the price would go down again. The National Tube Works Company are said to turn out over 1000 tons of pipe a day and the Pennsylvania, Pittsburgh Tube Company, Reading, American, Morris Tasker & Co. and Allison each 500 to 1000 tons in the same time. Some of these have the natural gas and own or have an interest in the gas wells and have to pay the same price per day, whether they run or not, as the gas cannot be shut off when they are idle, but must be burned in the open air at the end of a large pipe near their works. Some of the very largest works are financially strong, while some of the others are not, and the strong ones say they will not form a combination and reduce stock, as it will only galvanize the weak ones and start them up, but prefer to freeze them out if possible, then buy them up and destroy them, as they have done before once or twice.

CORRESPONDENCE.

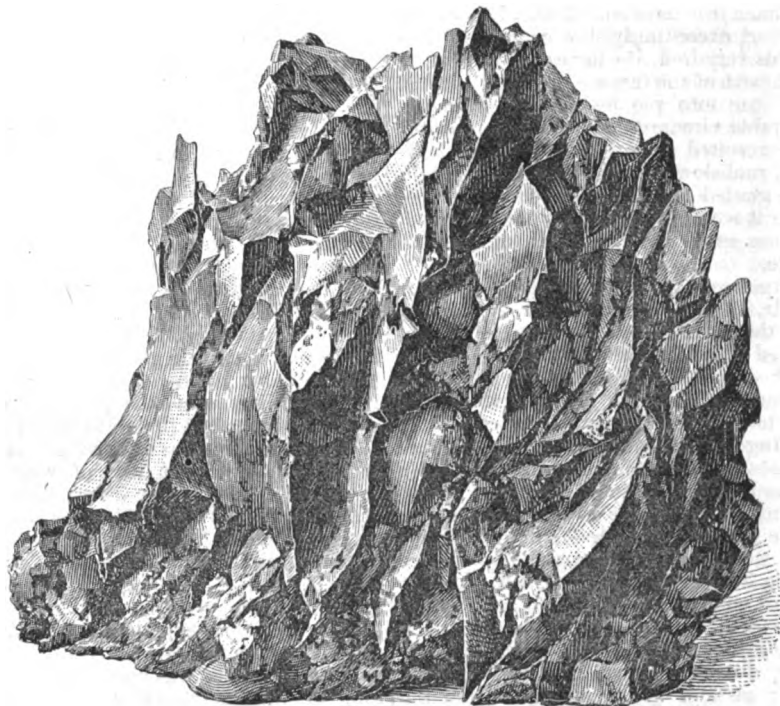
The Chemistry of Foundry Iron.

BETHLEHEM, July 6, 1888.

To the Editor—DEAR SIR : MR. Meissner's interesting and valuable articles on

cerned, was at a perfect standstill. Matters have not changed very much in that respect since then, and it is difficult to see why iron founders do not avail themselves of the aid which chemistry can offer them in selecting intelligently the quality of iron best suited for the purpose desired. The fracture of pig iron is a guide to its quality, no doubt, but a very inferior and untrustworthy one. It is absolutely impossible to judge from the appearance of the fracture either the fluidity or the shrinkage of an iron. A few experts in the foundry trade may be able to judge with some degree of approximation the relative scrap carrying capacity of two irons of the same grade, and possibly also to some extent the comparative softness or "machining" quality of the resulting casting, these properties depending upon the percentage of silicon and carbon, both of which influence the color and texture of the fracture. But even such expert judges find themselves completely at sea when they are called upon to select iron for a certain purpose from brands with which they are not familiar.

The mixtures of ore used, the kind of fuel employed, as well as the temperature and strength of blast are all factors which modify the appearance and quality of the resulting pig iron in a manner that may become very perplexing to those who may depend upon the appearance of the fract-



NO. 1 PIG IRON. NATURAL SIZE.

"The Chemistry of Foundry Iron" are giving impetus to a long and sadly neglected subject. A subject which it would be profitable both to the consumer and producer to investigate. Those versed and engaged in the processes of converting pig iron into ingot metal know and appreciate the value of chemical analyses, and there is no reason why the foundry trade should not be similarly benefited by a thorough knowledge of the chemical constituents of the raw material employed. From 1880 to 1883 the writer was engaged in running a chemical laboratory in a blast furnace town in the Shenango Valley. There were ten furnace stacks in the place, five or six of which were running. So long as several of them were making Bessemer iron the laboratory was kept quite busy, but when, as it sometimes happened, all of them were running on mill or foundry iron, the chemical business, so far as analyzing pig iron was con-

ure as the sole guide. The grain of an iron is an indication, but only in the case of a good No. 1 iron; a reliable indication of the condition of the furnace at the time such iron was produced. A good No. 1 iron is certain evidence that the furnace was in condition, so far as heat and chemical action are concerned, to produce the best grade of foundry iron from the mixture of ores and flux, with the kind of fuel and the temperature of blast active at the time.

No. 2 iron indicates a probability of an inferior condition in the furnace, but does not prove such to be the case, since the grain may have been affected by slow running and excessive dampness in the pig beds.

When No. 3 iron results it is pretty certain that the temperature and perhaps other chemical conditions were insufficient for the production of No. 1 foundry iron, though possibly even in this case exceedingly slow running and very wet pig beds

may have caused a No. 1 iron in the furnace to appear a No. 3 in the pig.

Supposing the latter to be the case, the chemical difference, excepting the relation between the fixed and graphite carbon, would probably be insignificant. If such be true, would the iron be less valuable than if it had been No. 1? Would it carry less scrap? If remelted under the same conditions, would it be likely to be less fluid or have a different shrinkage? Would it be inferior in its physical properties? Careful experiments would undoubtedly prove that the grain of the fracture is not a reliable indication of quality where the grade has been modified by external causes.

The accompanying cut illustrates a piece of pig iron (if iron from a blast furnace that has not been run into a pig mold can be properly so called) in which the crystals have been developed to a degree not often reached.

This iron was produced by the Sharpesville Furnace, which at the time was running on Nos. 1 and 2 Bessemer iron, producing principally the former grade. The lining suddenly becoming damaged the furnace had to be shoveled out. In the bottom was found a flat mass of iron 6 to 8 inches thick, weighing several tons, and of this the piece illustrated is a specimen. It got the benefit of slow cooling to the fullest extent. The crystals are so large and the planes of cleavage so well defined that the mass is comparatively frail. In this specimen we have an illustration of the effect of exceedingly slow cooling.

This very iron, if—instead of cooling in the hearth of the furnace, as it did—it had been run into pig beds under ordinarily favorable circumstances, would probably have resulted in a No. 1 pig. If, however, run slowly into wet beds it might have graded a No. 2 iron, and if cast into chills it would undoubtedly have come out a close grey forge or even mottled or white.

Experience teaches and the experiments of Mr. Meissner and others prove the fact that the grain of an iron can be much improved by paying proper attention to the pig beds and the running of the iron into the same. Since the consumers of foundry iron have established the custom of grading the iron solely by the appearance of its fracture, and are willing to pay a marked difference in the price, it is but natural and quite fair for the producers to strive to develop such marks of quality. That slow cooling improves the appearance of pig iron is an established fact, but that its real quality is thereby enhanced is not so evident. The sow has uniformly an opener grain than the pig, yet it is exceedingly doubtful whether it will make a better casting. The material in and the working condition of the furnace fixes the chemical composition upon which the true quality of the product depends, and this cannot be materially changed between the tapping hole and the pig bed. The loss of carbon due to the segregation of kish is not likely to be appreciable. Kish is a very light and bulky substance—1 or 2 pounds of it floating about will make a big show in the atmosphere of a casting house. Yet 2 pounds would mean a loss of only $\frac{1}{1000}$ of 1 per cent. on a 20-ton cast. The only appreciable chemical change which is effected by the rate of cooling is the change in the relative quantities of combined and graphitic carbon, and since the relation is completely disturbed in the process of remelting it would appear that the importance of graphitic carbon in pig iron is generally much overestimated. Very respectfully,

EDWARD A. UEHLING.

Natural gas stocks have had a sudden break, due to disagreement between iron manufacturers and the gas companies.

Prices of Alloys.

LOCKPORT, N. Y., U. S. A., July 6, 1888.

To the Editor: Referring to quotations from P. W. L. Bierman, of Hanover, Germany, published in your issue July 5, we beg to submit for publication the following table, comparing German prices with those made by this company upon the same alloys. We omit aluminium brass, as Mr. Bierman does not give the composition. The prices we quote on aluminium bronze are subject to liberal discount for quantity orders. Our aluminium bronze is aluminium and pure lake copper. In reducing the measures used by Mr. Bierman to American equivalents we estimate 1 mark = $24\frac{1}{2}$ cents, 1 kg. = $2\frac{1}{2}$ pounds. Very respectfully yours,

DUDLEY BALDWIN, JR.,
Manager The Cowles Electric Smelting and
Aluminum Company.

Prices of P. W. L. Bierman's, per pound.		Prices of Cowles E. S. & R. Co.'s., per pound.	
Aluminium	Bronze.	Aluminium	Bronze.
33 9-10 cents..... $2\frac{1}{2}$ per cent. Alu....	25 cents	33 9-10 cents..... $2\frac{1}{2}$ per cent. Alu....	25 cents
44 1/2 cents.....5 per cent. Alu....	33 cents	44 1/2 cents.....5 per cent. Alu....	33 cents
62 36-100 cents..... $7\frac{1}{2}$ per cent. Alu....	39 cents	62 36-100 cents..... $7\frac{1}{2}$ per cent. Alu....	39 cents
74 6-10 cents.....10 per cent. Alu....	46 cents	74 6-10 cents.....10 per cent. Alu....	46 cents
Ferro Aluminium.			
61 1/2 cents.....5 per cent. Alu....		61 1/2 cents.....5 per cent. Alu....	
	* 16 3-10 to 26 3-10 cents		
72 1/2 cents.....10 per cent. Alu....		72 1/2 cents.....10 per cent. Alu....	
	* 31 3-10 to 51 3-10 cents		
Silicon Copper.			
61 1/2 cents.....3 per cent. Si....		61 1/2 cents.....3 per cent. Si....	
	* $31\frac{1}{2}$ to $46\frac{1}{2}$ cents		
72 3-10 cents. 3 to 4 per cent. Si....		72 3-10 cents. 3 to 4 per cent. Si....	
.....6 per cent.* 36 to 56 3-10 cents		.....6 per cent.* 36 to 56 3-10 cents	
.....8 per cent.* 56 6-10 to 96 6-10 cents		.....8 per cent.* 56 6-10 to 96 6-10 cents	

The Duty on Wire Rods.

To the Editor: In recent issues of your paper have been published arguments presented to the Finance Committee of the Senate opposing any reduction of the duty on wire rods. Although these papers are most carefully and ably written, and one of them is the result of prolonged collaboration of several of the rod-makers, it is noticeable that no statements of the cost of rolling rods or the amount paid for labor appear in either of them. If the continuation of the present duty is necessary to enable the rod-makers to secure profitable returns on their investments and pay their present rate of wages, no argument could be so convincing as a presentation of a copy of their cost sheets and pay rolls. This, however, was carefully avoided. The advocate of a lower rate of duty, however, presented an affidavit made by a gentleman of long though not recent experience in rod rolling, that two years ago the cost of making rods from billets was not over \$7.50 per ton, of which \$3.10 was for labor, and that later improvements had reduced both amounts. This affidavit gave the cost in detail, and Mr. Garrett, inventor of the Garrett train now in general use, admitted its correctness as far as his knowledge extended. On this basis the cost of wire rods, based on quotations of billets in your latest issue (\$28), would be \$35.50 in Pittsburgh, against \$42.50, the price at which foreign rods can be delivered there. Viewed in another light, the cost price of American billets is \$5 per ton greater than foreign billets, if free of duty, could be delivered in Pittsburgh for; the duty on wire rods is about \$11, leaving a net benefit to rod mills by the tariff of about \$6 per ton. The total cost of labor in the process is not over \$3.10, and probably not now over \$2.60 per ton, and yet the rod mills urge an increase of about \$2.50 in the duty, which would give them a bonus of over \$8 per ton on the process of rolling alone. This is more than the entire cost of labor, fuel, interest on investments, &c., and it is about three times as

* According to size of order.

much as the total amount paid by them for wages. With full knowledge of these facts, Mr. Oliver, in behalf of the manufacturers present at the hearing, "earnestly and vigorously protested against anything less as destructive to the industry." He also stated "that the industry had a special claim on the favorable consideration of Congress." In view of the costs herein given it would seem that claim was being earnestly and thoroughly worked. In this communication it is not the writer's purpose to enter into a general discussion of the rate of duty on wire rods, or to attempt to refute all the specious arguments put forth by the advocates of higher duty, but merely to present to you and your readers indisputable facts and figures. Submitting these, let others draw their own conclusions. BARB WIRE.

Traction Increaser.—Craven's traction increaser, which is a drawbar between the locomotive and tender that automatically transfers a portion of the weight of the tender to the driving-wheels of the engine in proportion to the load which the engine is pulling, has lately been tried on the New York, Lake Erie and Western. It was first attached to No. 604, a consolidation engine with 950 pounds less on the rear drivers than on the other pairs. This engine hauled 10 per cent. more than its regular load from Hornellsville to Susquehanna, making running time. Subsequently the drawbar was attached to a 38-ton engine with four-coupled drivers 5 feet diameter, and cylinders 18 x 22. Weight on driving-wheels 48,000 pounds, 2000 pounds dead weight which had been placed on the footboard to increase the adhesion having been removed. This engine took $12\frac{1}{2}$ per cent. above the regular load, and in another case 14 per cent. additional, and made a creditable performance on the round trip between the points before named, on a day when a fine mist was falling during nearly the whole trip, there not being enough rain at any time to wash the rails.

The steel steamship Harlem, built by the Detroit Dry Dock Company, at its Wyandotte yard, for the Western Transit Line, was launched on the 3d inst. The Harlem is an exact counterpart of the Hudson, built last fall for the same line. She is 304 feet over all, 38 feet 6 inches beam and molded 36 feet deep. Her cargo will be 2500 tons on 15 feet of water. The Harlem will be ready for business in two weeks from the time of launching.

At a recent meeting of the Tennessee Coal, Iron and Railroad Company, the scheme proposed by the directors was authorized. Stockholders are being asked to surrender \$1,000,000 of the \$10,000,000 common stock at 30 per cent., subscribing for preferred stock at 90 per cent.

One of the longest tunnels in the world is the one at Schemnitz, Hungary. It has a length of 10.27 miles—1 mile longer than the St. Gothard and $2\frac{1}{2}$ miles more than the Mont Cenis tunnel. When the contract was made, in 1872, the work was let at about \$35 a yard, but for some years before its finish, a little while ago, the cost was about \$110 a yard.

Until recently the island of Corsica was entirely destitute of railroads. On the first of last month, however, the road from Ajaccio to Bastia, begun seven years ago by the Government, was opened for traffic as far as Corte, a distance of 45 miles. By reason of the high grades, numerous rock cuttings to be overcome, its cost has been \$33,250 per mile.

Foreign Markets.

EQUIVALENTS.

Franc, Peseta or Lira.....	Centas.
Florin (Netherlands).....	10.3
Florin (Austria).....	35.9
Milreis (Portugal).....	\$1.08
Milreis (Brazil).....	64.6
Mark (Germany).....	23.8
	Pounds.
Kilogram.....	2.20.5
Picul.....	134.

BRAZIL.

PARA. July 6, 1888.—*India Rubber*.—Our market during the week was at first irregular, with an easier tendency but later on rallied and recovered the decline in consequence of unfavorable crop news from the valley of the Amazon. Receipts at this point this month and next are, therefore, expected to be light.—*Per cable direct.*

CHILI.

VALPARAISO, May 11, 1888.—*Copper*.—Since the beginning of the month a decline took place from \$29.50 to \$28.70. At present no Copper is offering for sale except July shipments, and even about effecting any sales of the latter makers are indifferent, the trouble about the scarcity of hands and coal still being the same as before. Sales sum up for the fortnight 10,570 quintals, \$28.70 equaling £72.7/6. *Nitrate*.—A large business has been done, over 1,000,000 quintals changing hands at \$2.67½ @ \$2.80 for 95%, and \$2.80 @ \$2.85, 96 and 1%. Producers are at present less averse to selling futures, September-October delivery bringing as much as \$2.80 for 95%. Refined is scarce, and \$2.90 has been refused. Our Nitrate market is at present above European parity. Sales sum up 1,166,000 quintals; \$2.80 equals 87½¢ pwt. in England.

	Tons.
April shipment to Europe.....	52,000
April shipments to the United States...	5,500
Loading for Europe.....	32,000
Loading for the United States.....	4,500

Charters during the fortnight for Europe, 30,000 tons; for the United States, 3850. *Coal*.—Is sustained by a brisk demand. We quote spot Newcastle, 55/; afloat; April, 44/6; May, 41; Orrell, spot, 52/6; Australian, April sail, 40/1; May, 37/. *Exchange* has been fluctuating between 26 and 25½d., closing at 25½d., 90 days, London.—*Weber & Co.*

EAST INDIES.

SINGAPORE, July 3, 1888.—*Tin*.—June shipments to the United States from the Straits Settlements have amounted to 300 tons, as compared with 650 tons during the corresponding period of last year; to England there have been 100 tons, against 1200 tons since January 1. There were shipped to America altogether 850 tons, against 2600 tons, and to England 10,000 tons, against 6600.—*Gillilan, Wood & Co. to Chas. Nordhaus, New York, per cable.*

MANILA, July 3, 1888.—*Hemp*.—Our market during the week has been steady at \$8.50 pwt. against \$7.50 same date last year, equaling \$28. 15/ cost and freight, against \$26. 5/. Clearance for the United States since January 1, 91,000 bales, against 123,000 last year; loading for ditto, 8000, against 6000; cleared for England since January 1, 178,000 bales, against 98,000; loading for ditto, 5000, against 19,000; cleared for all other countries, 42,000, against 20,000; receipts at all ports since last cable, 3000, against 4000; ditto since January 1, 301,000, against 232,000 bales last year and 197,000 in 1886. Freight, \$5.50, against \$5 in 1887. *Exchange*, 3/5½, against 3/5½.—*Ker & Co. to Charles Nordhaus, New York, per cable.*

CALCUTTA, May 26, 1888.—*Jute*.—With the exception of a few localities in the Naraingunge District, where the rainfall was excessive, the new crop is making satisfactory headway. Advices from the large area around Mymensingh are particularly favorable. Old crop Jute is now neglected by exporters, while the Bengal spinners are absorbing the first receipts of new. Prices for the latter improved 3% during the week; the stock is further reduced. Futures are tending upward, and 10,000 bales August-September shipment via canal were taken during the week.—*Times of India.*

PENANG, May 26, 1888.—*Tin*.—Receipts during the fortnight reached 5000 piculs; Europeans meanwhile only bought 500 piculs, but Chinese took 6000. After declining in the beginning from \$34.50 to \$33.90 the market recovered at the close to \$34.75, at which Chinamen have been buying. The latter also took their unsold stock and shipped it to China. There now remain unsold in Bazaar 3000 piculs.—*Schmidt, Kustermann & Co.*

AUSTRALIA.

FREMANTLE, WESTERN AUSTRALIA, May 15, 1888.—*Gold*.—Advices from the placer diggings

in the Kimberley District Gold fields are of the most encouraging kind; a large immigration is pouring in, and vessels are loading for this port at Melbourne, Sydney and Adelaide. The mines are easily accessible from King George's Sound in our immediate vicinity, and from Cambridge Gulf in the North. From the latter the distance to the placers is 200 miles and from here 350 miles.—*Argus.*

RUSSIA.

ST. PETERSBURG, June 25, 1888.—*Petroleum*.—A syndicate of capitalists at Odessa is building at present on the banks of the Danube, at Galatz and Orsova, large stationary tanks in order to ship in flat tank lighters Petroleum direct on the Danube to Austria and Southern Germany. *Steel*.—The Government is about to construct several large works in Southern Russia for the manufacture of Bessemer Steel, the casting of Guns and for extensive machine shops. *Dynamite*.—For the first time the Government has resolved to allow Dynamite to be manufactured in Russia. A concession has been granted a Swedish firm to make it.—*Journal de St. Petersbourg.*

SPAIN.

BILBAO, June 23, 1888.—*Iron Ore*.—Stagnation has been intensified, the normal quotation being 7/6 @ 8/ for Campanil, and 6/10 @ 7/3 Rubios. The total shipments since January 1 amount to 1,827,669 tons, against 2,205,906 last year. *Pig Iron*.—Only coastwise shipments were made to the extent of 1272 tons.

Shipments from Spain During the first Four Months.

	1886.	1887.	1888.
	Tons.	Tons.	Tons.
Calamine.....	10,002	8,267	8,518
Pyrites.....	233,555	266,679	270,754
Iron Ore.....	1,516,336	1,822,534	1,622,628
Pig Iron.....	21,903	39,183	19,689
Precipitate.....	8,125	9,823	10,164
Quicksilver.....	465	565	614
Pig Lead.....	38,187	42,972	44,461

Totals... 1,828,573 2,190,043 1,976,838
—*Bilbao Marítimo y Comercial.*

GERMANY.

HAMBURG, June 30, 1888.—*Iron*.—The Rhenish-Westphalian Iron market has been quieter, but none the less firm, as Iron Ore remains steady. Stocks of Pig have increased 5500 tons in May which is not much. May production in Germany and Luxembourg has been 360,855 tons of Pig, against 327,282 last year. There were made 173,535 tons Forge and Spiegel, 35,361 of Bessemer; 108,248 Thomas, and 43,711 Foundry. Since January 1 the production during the first five months has been 1,756,310 tons of Pig, against 1,527,721 during the corresponding period of last year. Spiegel has been less lively latterly, and can now be had for 57 marks, 10 to 12% Manganese. In order to be able to sell Forge Pig, not active at home, for export, it has to be shaded. Foundry Pig has been moderately active and steady. The demand for Thomas has increased perceptibly, production is now correspondingly greater, but it is extremely firm. Bessemer remains neglected. The finished Iron inquiry is slack still; dealers only buy for immediate wants. The structural branch forms an exception, notably as regards Beams; an advance seems to impend therein; it is difficult to procure any for speedy delivery. The associated Rhenish-Westphalian rolling mills received 13,000 tons orders during the past six weeks. There has been no change in Hoops. Something will have to be done to facilitate exportation. Boiler Plate makers are busy steadily; the reverse is the case with Thin Sheets, so that production has to be curtailed. Wire Rods and Wire Goods generally are dull. A satisfactory state of things is reported by foundries, machine shops and car-makers. *Metals*.—All metals have been steadily dealt in in this market and are firm. We quote: German Lead, 12.70 @ 13.20 marks pwt. 50 kg. Lake Copper, 80 @ 81, and Silesian Spelter, 16 @ 18; Zinc Gray, 20 @ 22; ditto White, 21 @ 32, and Tin Salt, 60 @ 85.—*Borsenhalle.*

A Large Terrestrial Globe.—According to *La Nature* an immense terrestrial globe, constructed on the scale of one-millionth, will be shown at the Paris Exhibition of 1889. A place will be set apart for it at the center of the Champ de Mars. The globe will measure nearly 13 m. in diameter, and will give some idea of real dimensions, since the conception of the meaning of a million is not beyond the powers of the human mind. Visitors to the exhibition will see for the first time on this globe the places really occupied by certain known spaces, such as those of great towns. Paris, for instance, will barely cover a

square centimeter. The globe will turn on its axis, and thus represent the movement of rotation of the earth. The scheme was originated by MM. T. Villard and C. Cotard, and *La Nature* says that it has been placed under the patronage of several eminent Frenchmen of science.

Lifts on Canals.

In the course of a paper on canal engineering, read by Mr. L. F. Vernon Harcourt, at the recent Conference on Canals and Inland Navigation, held at the British Society of Arts, London, the author stated that the adoption of hydraulic lifts for connecting two reaches of a canal, where the difference of level is considerable, appears to be growing in favor at the present time. The system is comparatively modern, for though a simple lift, with two counterbalancing troughs, lifted and lowered 8-ton barges a vertical distance of 46 feet on the Grand Western Canal many years ago, it was subsequently abandoned. The first hydraulic lift was erected at Anderton, in 1875, for connecting the river Weaver with the Trent and Mersey canal. The difference of level is 50½ feet; and the barges are raised or lowered in two wrought-iron troughs, 75 x 15½ feet, with 5 feet depth of water, each resting on a central hydraulic ram, 8 feet in diameter, working in two hydraulic presses underground, which can be connected at pleasure, making the troughs counterbalance one another. One trough accordingly ascends as the other descends, the motion being imparted by removing 6 inches of water from the lower trough; and only the final lift of about 4½ feet, required when the descending trough reaches the water in the lift pit, has to be effected by hydraulic power. The whole lift is accomplished in 2½ minutes, and one 100-ton barge can be transferred from the river to the canal, and another from the canal to the river, in eight minutes, with an expenditure of only 6 inches depth of water over the area of one trough, and the power required for the final short lift. A similar lift, on a somewhat larger scale, has recently been opened at Les Fontinettes near St. Omer, on the Neufossé Canal, in place of a flight of five locks, which were inadequate for the traffic. The height of lift is 43 feet, and each trough is 182½ feet by 18½ feet, containing a depth of 6½ feet of water and weighing 700 tons, and accommodates barges of 300 tons. On the Canal du Centre, in Belgium, there is a rise of 220 feet in a distance of only 5 miles, and this is to be surmounted by four hydraulic lifts similar to, but still larger than, the two just described.

In the very useful scientific methods whereby movements record themselves in curves, photography and a point moving on a smoked surface are, perhaps, those forms which yield the most delicate curves. In the French Société d'Encouragement, M. Mascart has called attention to a useful modification by M. Fénon, in which a bent tube of tempered steel forms a syphon dipping at one end in a reservoir of ink and at the other being shaped like a pen point, which is brought near the moving paper (the sloped section outward). Capillary force prevents outflow when the apparatus is at rest. A fine trace is produced by this pen, without interruption by the most rapid displacements and without sticking when at rest. M. Wolf, of the Paris Observatory, has used the system for getting records of air-pressure, temperature, wind, &c., with the best results. The reservoir needs charging only once a week, and, using inks mixed with glycerine, a single charge has been found to suffice for a barometer record of more than six months.

TRADE REPORT.

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St.,
PHILADELPHIA, PA., July 10, 1888.

Pig Iron.—Business has been very dull since the opening of the month, but it could hardly be otherwise, considering the season and other coincident influences. There is not enough doing to determine the exact character of the market, but in the majority of cases it appears that sales cannot be made in quantity without allowing concessions of more or less importance. The consequence is that those controlling favorite brands are feeding them out in small lots at quoted rates, which, with the deliveries on old contracts, keeps the furnaces clear of accumulation. But in other directions the situation is less satisfactory. The supply is in excess of the demand, and buyers for round lots cannot be found, unless at lower figures than have hitherto prevailed. As regards Southern and Western Irons, the outlook is decidedly uncertain. The offerings are constant and liberal, but bids at figures likely to be accepted are both few and far between, so that the indications are that the Iron must be piled up at furnaces or marketed elsewhere. Which of these alternatives will be adopted, or whether a lower range of prices will be accepted, depends upon the adjustment of values in other markets. During the past few days sales of good Western Mill Irons in moderate quantities have been made at from \$15.50 to \$15.75, delivered in Philadelphia or at points near by. At these figures there seems to be a good supply, but nothing to indicate much lower prices, so that these rates are presumably about on a level with what could be realized elsewhere. Some Southern Irons, said to be equal to Pennsylvania No. 3 Mill, have been offered at \$14.50 @ \$15, ex-ship Philadelphia, but were not accepted, and as sales were not urged at lower figures it is supposed that they were about equivalent to what can be obtained at other points. Pennsylvania brands have been sold chiefly at from \$18 to \$18.50 at tide for No. 1 Foundry, \$17 to \$17.50 for No. 2, and \$15 to \$16.50 for Gray Forge, the feeling being steady on desirable brands, but a little unsettled on all others, as the supply seems to be increasing, without any corresponding increase in the demand.

Foreign Iron.—There is no demand, although inquiries for good sized lots have been made. Prices were entirely too high, however, so that nothing is likely to come of it. Asking prices for Bessemer, c.i.f., duty paid, \$19.50 @ \$20, and for 20 % Spiegel, \$26.75 @ \$27.25.

Blooms.—Business has been rather quiet during the past couple of weeks, but there is renewed inquiry for Steel, with bids at from 50¢ to \$1 per ton less than quoted rates, which are about as follows: Domestic Rail Blooms, \$28 @ \$28.50, Slabs and Billets from \$29 to \$35, f.o.b. cars at mill, according to analysis; Charcoal Blooms, \$52 @ \$54; Run-out Anthracite \$42 @ \$44; Scrap Blooms, \$34 @ \$35 per "bloom" ton of 2464 lb. Foreign at tide, c.i.f., duty paid, \$30 @ \$31 for Nail Slabs; \$31.50 @ \$32.50 for 4 x 4 Billets, and \$35 @ \$39 for Siemens-Martin, price according to analysis, &c.

Bar Iron.—The mills in this vicinity are well supplied with orders for two or three weeks to come, and are, therefore, firm in making quotations for new business. There is not much inquiry, however, and most of the business offered is in small lots, prompt delivery, for which full

prices are obtained. Large lots are not wanted unless at very low prices, and even then there is no great urgency to place orders. From present appearances it seems likely that the Pittsburgh mills will soon all be at work, hence the indifference shown by buyers, unless orders are accepted at the very inside figures made some time ago. For this reason transactions have been of a limited character, although at comparatively firm prices, say 1.85¢ @ 1.9¢ for Best Refined Bars, and 1.82¢ for Grooved Skelp, although for good-sized lots buyers stand out for lower figures, varying from \$1 to \$2 per ton, according to the character of order, as to quantity, quality, delivery, &c.

Muck Bars.—There is very little demand, and prices are again slightly easier, although from \$27 to \$27.50, delivered, are the ordinary asking rates. Sales chiefly at the inside figure.

Plate and Tank Iron.—The Plate mills appear to be in better condition than they have been for some time, and are, in most cases, quoting from 2¢ up for Ordinary Plates. But there is not much new business offering, so that it is still an open question whether they can maintain the position they have assumed. Neither would it require much of a demand to put prices a little higher still, so that all depends on developments during the next two or three weeks. Meanwhile quotations are about as follows: Ordinary Plate, 1.95¢ @ 2¢; Tank, 2¢ @ 2.10¢; Shell, 2.4¢ @ 2.5¢; Flange, 3.5¢; Fire-Box, 4¢; Steel Plates, Tank and Ship Plate, 2.3¢ @ 2.4¢; Shell, 2.7¢; Flange, 3¢ @ 3½¢; Fire-Box, 3½¢ @ 4½¢.

Structural Iron.—There is very little new business on the market, and, from present appearances, the demand will not be of much importance until after the election. The mills have some work on hand, however, which, with the current demand for small lots, is expected to keep them fairly well employed for the present. Prices are unchanged and about as follows: 2.05¢ @ 2.10¢ for Bridge Plate; 2¢ @ 2.10¢ for Angles; 2.6¢ @ 2.7¢ for Tees, and 3.8¢ for Beams and Channels, Iron or Steel.

Sheet Iron.—There is a fair demand for Sheets, with rather more than the usual amount of inquiry for large lots, although as yet orders of this class have not been placed to any extent, as buyers are probably waiting to see how things turn out in Pittsburgh. Prices are steady and unchanged, and for small lots are quoted about as follows:

Best Refined, Nos. 26, 27 and 28....	3¼ @ 3½¢
Best Refined, Nos. 18 to 25.....	3 @ 3½¢
Common, ¼¢ less than the above.	
Best Bloom Sheets, Nos. 26 to 28....	4¼ @ 4½¢
Best Bloom Sheets, Nos. 22 to 25....	4 @ 4½¢
Best Bloom Sheets, Nos. 18 to 21....	3½ @ 3¾¢
Blue Annealed.....	2.8 @ 3 ¢
Best Bloom, Galvanized, discount.....	.62½ %
Common, discount.....	.67½ %

Merchant Steel.—Trade is very dull in this department, as is usual at this season of the year. Sales are mostly made in small lots for immediate delivery. Prices are nominally as follows: Tool Steel, 8½¢; Machinery, 2½¢ @ 3¢; Crucible Spring 4½¢; Open-Hearth Ordinary Spring, 2½¢; Crucible Machinery, 5¢; Best Sheet Steel, 10¢; Ordinary do., 8¢.

Old Rails.—The offerings in this market are extremely light, and in most cases are held above the market. One or two lots of T Rails, amounting to nearly 2000 tons, were sold at \$21.75 delivered at mill near Philadelphia, with buyers still on the market at about \$21, Philadelphia, or its equivalent.

Steel Rails.—There is rather more inquiry for Rails, and the feeling is more hopeful than it was a few weeks ago. Sales during the first half of the year are

stated to be about 950,000 tons, with deliveries during the same time of two-thirds that amount. It is estimated that deliveries during the last half of the year will bring up the total to nearly 1,400,000 tons. Sales during the week have been chiefly on the basis of \$30 at mill, which is a firm quotation on the average run of orders.

Scrap Iron.—Dull and neglected, asking prices about as follows: \$19 @ \$20 for cargo lots; \$20 @ \$21 for carload lots, delivered, or for choice \$21.50 @ \$22; No. 2 do., \$14 @ \$15; Turnings, \$18 @ \$14; Old Steel Rails, \$19 @ \$20; Cast Scrap, \$14 @ \$15; do. Borings, \$9 @ \$10; Old Fish Plates, \$24 @ \$25. Old Car-Wheels, \$17 @ \$18, Philadelphia, or its equivalent.

Wrought-Iron Pipe.—There is nothing to note in connection with the Pipe trade. The demand for all sizes is fair, with something of a scarcity in the smaller sizes. Prices do not improve any. Discounts are quoted as follows: Black Butt-Welded, 55 %; on Galvanized do., 45 %; on Black Lap-Welded, 65 %; on Galvanized do., 55 %; on Boiler Tubes 60 %.

Nails.—The demand for Nails is limited, but the usual stoppage of the mills at this period prevents what would otherwise be a considerable accumulation of stock. Price is quoted at \$2, net, for carload lots, although sales are occasionally made at lower figures, but they are usually from mills where product is not familiar to the trade.

Chicago.

Office of *The Iron Age*, 96 and 97 Washington St.,
CHICAGO, July 9, 1888.

Pig Iron.—Some dealers report an increase in mail orders during the week, but otherwise the condition of business is unchanged. Local buyers are bidding lower rates than have yet been made, in the belief that the stoppage of so many rolling mills will make Iron cheaper, but they are not meeting with much success in pushing down prices. The Chicago market is now relatively lower than the other Western trade centers, and sellers are strenuously resisting a further decline, except in Ohio Softeners and Southern Coke Foundry Irons, on which a slight decline is noted. The time is now fast approaching when an important class of heavy consumers will be in the market for a year's supply, and much speculation is being indulged in as to the extent of that trade this season. The production of Lake Superior Charcoal Pig has been heavily curtailed quite recently, and sellers now feel more sanguine of their ability to prevent a further decline. Cash quotations are as follows, f.o.b. Chicago: Lake Superior Charcoal, all numbers, \$19 @ \$19.50; Alabama Car-Wheel, Nos. 1 and 2, \$25.25; do., Nos. 3 to 6, \$26.25; Southern Charcoal Foundry, No. 1, \$18; Jackson County Softeners, No. 1, \$17.50 @ \$18; Hocking Valley, Soft Foundry, No. 1, \$16.50 @ \$17.50; American Scotch (Blackband) No. 1, \$18.50 @ \$19.50; other Ohio Scotch Irons, No. 1, \$17.50 @ \$18; Lake Superior Coke, No. 1, \$17 @ \$17.50; No. 2, \$16 @ \$16.50; No. 3, \$15 @ \$15.50; Southern Coke, No. 2, \$16.75 @ \$17.25; No. 2½ and Open Bright, \$16.50; No. 3, \$15.50; No. 1 Mill, \$14.50 @ \$15.50. Attention is called by buyers to their detection of attempts by parties making very low quotations to ship Iron of an inferior grade to that which was actually contracted for. The responsibility for such a practice lies between the furnace company and their agents, but the furnace company, of course, are the sufferers when the deception becomes apparent and the confidence of buyers is lost.

Bar Iron.—Agricultural implement manufacturers are beginning to place contracts for their year's supply. Some were closed during the past week at about 1.65¢, half extras, delivered. Mill prices for early delivery are irregular, agents for mills now stopped on account of the strike quoting 1.65¢ @ 1.70¢, while others, representing non-union works, name 1.62½¢ @ 1.65¢, half extras, for Common Iron. Store prices have been advanced on account of increased rates asked by the mills, and quotations now range from 1.90¢ to 2¢, according to quantity and quality.

Structural Iron.—Some important orders for city viaducts are expected in the market soon. Prices are stiffer, owing to the stoppage of many mills. Carload lots from mill are now quoted as follows, f.o.b. Chicago: Angles, 2.15¢ Universal Plates, 2.20¢; Tees, 2.45¢; Beams, 3.40¢. Store prices are unchanged at the following rates: Angles, 2.40¢ @ 2.70¢; Tees, 2.60¢ @ 2.90¢; Beams and Channels, 3.80¢.

Plates, Tubes, &c.—A large business was done in Plates during the week, and prices are very firm at the following rates from store: Heavy Sheets, Nos. 10 to 14, 2.65¢; Tank Iron, 2.55¢; Tank Steel, 2.80¢; Shell Iron, 3¢; Shell Steel, 3.25¢; Flange Iron and Steel, 4¢; Fire-Box Steel, 4.75¢ @ 5.75¢; Boiler Rivets, 4¢ @ 4.25¢; Ulster Iron, 3.75¢; Boiler Tubes, 60 % and 10 % off on 2½-inch and larger and 62½ % off on 2-inch and smaller. It is claimed that only small lots of Tubes will be sold at these prices, as cost is not being realized.

Sheet Iron.—Mills in a position to sell for immediate or early delivery are advancing their prices, and now ask 2.95¢ for No. 27 Common, f.o.b. Chicago, some even naming 2.85¢ at mill. Inquiries are being received from buyers who would like to lay in stock if it could be had at the former rates. From store No. 27 is still quoted at 3.30¢.

Galvanized Iron.—Mill agents report a very good demand, which would make this month's sales the heaviest ever known, if it should keep up and stocks would hold out. Small lots are still quoted at 60 % and 5 % off for Juniata, and 60 % and 10 % off for Charcoal.

Merchant Steel.—Store business was very good during the week and a number of mill orders were booked, although the large consumers are not yet in the market for their next season's supply. Store prices are as follows: Bessemer Bars, 2.30¢ @ 2.50¢; Tool Steel, 8¼¢ @ 9¼¢; Specials, 13¢ @ 25¢; Crucible Spring, 4.40¢; Open-Hearth Spring, 2.90¢; Open-Hearth Machinery, 2.75¢ @ 3¢; Crucible Sheet Steel, 7¢ @ 11¢.

Steel Rails.—A moderate demand for small lots has been experienced by the local mills. Large orders are in sight, but they will not be placed until certain financial preliminaries are settled. For small lots, such as are now being booked, prices range from \$32 to \$32.50.

Old Rails and Wheels.—The only sale of Old Iron Rails coming to light was one of 200 tons at \$18.50. Sales of short lengths of Old Steel Rails have been made at \$13.50. A few carloads of old Car-Wheels brought \$18, but \$18.50 has been offered for more without securing them.

Scrap.—Very little is being done in this line at present. A sale of No. 1 Forge is reported at \$18, and small lots of other Scrap have been taken by consumers for immediate use. Mixed Country Scrap is probably worth about \$12, and dealers' selling quotations are about as follows, per ton of 2000 lb: No. 1 Forge, \$17 @ \$18; Track, \$16.50;

No. 1 Mill, \$13; Light Wrought, \$9—Horseshoes, \$16.50; Axles, \$22 @ \$23; Cast Machinery, \$12.50 @ \$13; Stove Plate, \$9.50; Cast Borings, \$8.50; Wrought Turnings, \$10; Axle Turnings, \$12; Coil Steel, \$13.50; Leaf Steel, \$14.50; Locomotive Tires, \$15.

Hardware.—A very good demand is reported for Heavy Hardware. The stoppage of Western rolling mills has stiffened the prices of many goods made of Bar Iron. Nuts, Washers and Carriage and Wagon Hardware have felt this influence and responded to it. The hope is expressed by merchants that the mills will remain closed for some time until stocks are depleted and the market is put in healthy condition. In Shelf Hardware some houses report a large trade in progress, while others find their volume of business only fair. Nails and Barb Wire are particularly dull, but Builders' Hardware is in good demand and seasonable articles are moving freely.

Nails.—A strong inclination to buy is developing among the heaviest purchasers in this vicinity, but thus far the Cut-Nail factories have refused to meet their views as to price. Along the Missouri River and at other Western points large stocks of Nails are still held, which were bought during the freight war, so that very little business is expected by the factories from that quarter for some time. The Wheeling factories are generally quoting \$1.80 at factory for Steel Nails, and insist on very favorable specifications as an inducement to shade this price, but the manufacturers of other localities are less firm in their views, and sales have been made by them at \$1.87½ here, and in some cases at even lower rates. Wire Nails are again moving more freely in the direction of large buyers, some sales of round lots having been made during the week at very low prices. Jobbers' quotations are now \$2.05 for small lots of Steel Nails, shaded according to circumstances, and \$2.50 @ \$2.60 for Wire Nails, according to quantity.

Barb Wire.—Very little business is now being done in this line, either by manufacturers or jobbers. Small lots are quoted at 3¢ for Painted, and 3.75¢ for Galvanized.

Copper.—A fair volume of business is reported by dealers at 25¢ rates, but the contrast is very marked with the exceedingly active demand at the corresponding period of last year. Copper Sheets were then called for in large quantities by cornice-makers, with whom they were displacing Galvanized Iron. High prices of Copper have restored the old conditions.

Pig Lead.—The sales of the week footed up about 500 tons of Common and Refined at 3.80¢ @ 3.90¢. A good inquiry is reported, which has imparted a firm undertone to business.

E. A. C. Du Plaine, brass founder and smelter, manufacturer of Rabbitt anti-friction metals, &c., has removed from 66 South Canal street to 240 South Jefferson street, Chicago. In his new location he enjoys more extensive facilities for his increasing business, and the entire plant is arranged with a view to securing the utmost convenience in handling materials.

Detroit.

WILLIAM F. JARVIS & Co., under date of July 9, report as follows: It is rather a difficult thing to give any new features relative to the Pig Iron market that would excite any particular interest. Trade is quiet. There is large buying being done almost continually, but we have to report that figures have not yet improved to any degree, and while this has been the case for the past month, very few, if any, con-

cessions are made below the quoted prices of June 1. What was looked upon here a week ago with considerable anxiety—namely, the failure of the mills to sign the Amalgamated Scale—has passed partially, many of the larger mills having accepted the terms of the association. Shipments of Ore are being increased rapidly and large business is anticipated right up to the close of navigation. Lake Superior Charcoal Iron is moving off as rapidly as is usual at this season, when Lake rates are taken advantage of. The market is firm on a very low basis, and is fairly quotable to-day as follows:

Lake Superior Charcoal, all numbers.....	\$20.00 @ \$20.50
Lake Superior Coke, all ore.....	19.00 @ 19.50
Lake Superior Coke, cinder mixed.....	18.00 @ 18.50
Standard Ohio Black Band.....	19.00 @ 19.50
Southern No. 2.....	17.75 @ 18.25
Southern Silvery.....	17.00 @ 17.50
Southern Gray Forge.....	15.50 @ 16.00
Jackson County (Ohio) Silvery.....	18.50 @ 19.00
Old Wheels.....	19.00 @ 20.00

Cincinnati.

Office of *The Iron Age*, Fourth and Main Sts.,
CINCINNATI, July 9, 1888.

Pig Iron.—A more confident tone prevails in the market for Pig Iron, and during the past week there has been a fair inquiry, but the volume of actual business has been smaller. Furnaces, where they can make the delivery desired, are asking an advance of 25¢ per ton, but while buyers are more anxious to buy at previous prices they are not disposed to pay an advance. Sales of both Foundry and Forge grades have been made in moderate amounts for both present and future delivery, but there has been more irregularity than for some time past. No. 2 Foundry is reported obtainable at \$15, but \$15.50 is generally asked. No. 2 Mill is quotable at \$13 @ \$13.50, with one lot of 1000 tons selling at the outside rate. Lake Superior Charcoal Iron has met an improved demand, with sales of 100 to 1000 ton lots, mainly at \$20.50, cash. There are no new features of prominence, there being no new conditions upon which to build a change as yet. The only point of interest is that a firmer tone prevails, and that there is an evident desire to secure low-priced Iron, but no urgency to buy, consumers well understanding the advantage to be obtained for undue haste. Prices current here, cash, f.o.b., are approximately as follows:

Hot-Blast Foundry.

Southern Coke, No. 1.....	\$16.50 @ \$17.00
Southern Coke, No. 2.....	15.50 @ 16.00
Southern Coke, No. 3.....	15.00 @ 15.50
Ohio Soft Stone Coal, No. 1.....	17.00 @ 17.50
Ohio Soft Stone Coal, No. 2.....	15.00 @ 15.50
Mahoning and Shenango Valley.....	16.50 @ 17.00
Hanging Rock Charcoal, No. 1.....	20.50 @ 22.50
Hanging Rock Charcoal, No. 2.....	19.00 @ 21.00
Tennessee and Alabama Charcoal, No. 1.....	17.50 @ 18.00
Tennessee and Alabama Charcoal, No. 2.....	16.50 @ 17.50

Forge.

Strong Neutral Coke.....	13.50 @ 14.00
Mottled Neutral Coke.....	12.50 @ 13.00
No. 1. Mill Coke.....	13.50 @ 14.00
No. 2 Mill Coke.....	13.00 @

Car-Wheel and Malleable Irons.

Southern Car-Wheel.....	20.00 @ 23.00
Hanging Rock, Cold Blast.....	22.00 @ 25.00
Lake Superior Car-Wheel and Malleable.....	21.00 @ 22.00

Manufactured Iron.—Two of the local mills have signed the scale demanded by the Amalgamated Association, but the others are yet unwilling to yield. The Iron workers, however, appear to have the best of the situation, and are confident of ultimate success. Bar Iron is reported very dull, and although the card rates are firm at 1.90¢ @ 2¢ it is reported obtainable at 1.50¢, and no doubt concessions are granted on the local product, but there is considerable irregularity. Bar and Sheet Iron—Common Bar Iron, 1.90¢ @ 2¢; Charcoal Bar Iron, 2.90¢ @ 3¢; Sheet Iron, Boiled, Nos. 10 to 27, 2.50¢ @ 3.25¢; Sheet Iron, Charcoal, Nos. 15 to 25, 3¼¢ @ 4¼¢ per lb.

Nails.—There has been a moderate demand and an easy market at previous prices, based upon 12d @ 40d, which sell at \$2 7/8 keg, with 10¢ rebate in carload lots at mills; 50d @ 60d, 25¢; 10d, 10¢; 8d @ 9d, 25¢; 6d @ 7d, 40¢; 4d @ 5d, 60¢; 3d, \$1, and 2d \$1.50 per keg more. Steel Nails sell at \$2 and Steel Wire Nails at \$2.65 @ \$2.75 7/8 keg.

Old Material.—There has been a moderate inquiry for Old Rails \$19, but holders ask \$19 @ \$20, cash. New Rails are held at \$30, and 900 tons sold at nearly this rate. Old Wheels are neglected and nominal at \$19, spot.

Chattanooga.

Office of The Iron Age, Ninth and Carter Sts.,
CHATTANOOGA, TENN., July 9, 1888.

An event of much interest to this particular section occurred a few days since, the occasion being the opening of the Chattanooga, Rome and Carrolton Railroad from this point through Rome to Carrolton. This line nearly its entire length skirts as fine beds of Bessemer or Red Ores as are to be found in the Southern States, besides giving a fourth line directly from this point to Southern Georgia and Alabama.

Pig Iron.—There appears to be no animation nor special activity in the markets. There is one thing that producers appear to be unanimous upon, and that is the present basis of prices is as low as they will go. A few spasmodic sales may and undoubtedly will be made at cut figures, but as a general thing it is thought that prices will go no lower. For the past week the inquiries for Foundry Irons here have been on the increase, and there appears to be a growing disposition in consumers to make long contracts, based on present prices, and quite a number have been made. The fact is that all along there has not been a surplus of good Foundry Irons, and all of the old furnaces have had no trouble in disposing of their output at regular prices. It is true that many of the stacks are "sold ahead," and are not worrying about the near future, while the old stacks are also keeping their desirable stocks well in hand. Of course the new plants are feeling around in every direction for a market, and in order to get in sometimes make concessions, but taking everything into consideration the feeling that prevails is quite noticeable on the better side. There has been quite a perceptible increase in the demand for Pipe Irons, and some quite large sales have been made, but at low prices.

Miscellaneous.—Strange as the statement may appear, there are new companies forming by wealthy parties for the construction of at least three more furnaces in the Southern district—one at this place and two near Birmingham. Of the one at this place there is but little doubt of its consummation, as the conditions that prevail in the organization are peculiarly favorable to its materialization. It will be of the most modern type and located but a short distance from this place. Among the different manufacturers there is no complaint of any lack of orders, and all are running full. The Chattanooga Wooden Pulley Company have their works now fully completed, and are running with a full force of hands with plenty of orders.

Louisville.

LOUISVILLE, KY., July 9, 1888.

Pig Iron.—There has been no change in the market from last week, although a few good-sized orders have been taken. There is a disposition to make purchases for long deliveries, in some instances to run for 12 months. This desire to contract for a year's supply meets with favor

from a few furnaces, but the majority prefer not to sell longer than to January 1. If the views of parties desiring to buy largely for future delivery meet with favor on the part of furnacemen, the heavy sales will give steadiness to the market and will, it is thought, advance prices for immediate wants. There is a scarcity of Foundry grades, and though price is about the same as last week, for immediate delivery buyers are willing to offer 25¢ 7/8 ton more money. The rolling mills hope that the question between them and the Amalgamated Association will soon be settled and as there is some chance of this being done, it is hoped the market will be benefited.

Southern Coke, No. 1 Foundry.....	\$16.00 @ \$17.00
" " No. 2 " " " " " "	15.00 @ 16.00
" " No. 3 3/4 " " " " " "	14.50 @ 15.00
Hanging Rock Coke, No. 1 Foundry.....	16.50 @ 17.00
Hanging Rock Charcoal, No. 1 Foundry.....	20.25 @ 22.25
Southern Charcoal, No. 1 Foundry.....	17.25 @ 17.75
Silver Gray, different grades.....	13.25 @ 14.25
Southern Coke, No. 1 Mill, Neutral.....	12.75 @ 13.75
" " No. 2 " " " " " "	12.25 @ 13.25
" " No. 1 " " Cold Short.....	12.25 @ 13.25
Southern Charcoal, No. 1 Mill.....	13.25 @ 14.75
White and Mottled, different grades.....	12.00 @ 12.50
Southern Car-Wheel, standard brands.....	21.50 @ 24.50
Southern Car-Wheel other brands.....	18.50 @ 20.50
Hanging Rock, Cold Blast.....	22.50 @ 24.50
Hanging Rock, Warm Blast.....	18.50 @ 19.50

Cleveland.

CLEVELAND, July 9, 1888.

Iron Ore.—The shipments from upper lake ports since the opening of navigation aggregate 1,275,000 tons, against about 1,350,000 tons shipped up to a corresponding period last year. Vessel rates are still growing more and more favorable to the shippers. The Escanaba rate is now 85¢, while charters can be obtained from Ashland at \$1.15 and from Marquette at \$1.10. The strike at Pittsburgh and in other iron centers has interfered perceptibly with the active buying movement noted one week ago. The same influences will probably be felt this week, but if the labor troubles, in which Ore purchasers are so directly interested, are adjusted quickly there are excellent prospects for a fair ending to a season which started out poorly. Considerable Gogebic Ore has been sold during the past week—one 25,000-ton lot for far Eastern delivery bringing a price equivalent to \$4.70 f.o.b. vessels Cleveland. Additional sales of non-Bessemer Hematites are reported at \$3.50 and very fair grades of non-Bessemer Menominee Ores have been bought for \$3.70 @ \$3.85 7/8 ton. The following are the quotations:

No. 1 Specular and Magnetic Ores, Bessemer quality.....	\$5.75 @ 6.00
No. 1 Specular and Magnetic Ores, Non-Bessemer quality.....	5.00 @ 5.25
Red Hematite Ores, Bessemer quality.....	4.75 @ 5.00
Red Hematite Ores, Non-Bessemer quality.....	3.50 @ 4.00
Menominee Range Ores, Bessemer quality.....	4.80 @ 5.00
Menominee Range Ores, Non-Bessemer quality.....	3.70 @ 4.00
Gogebic Range Ores, Bessemer quality.....	4.50 @ 5.00

Pig Iron.—The favorable outlook noticed last week has continued and the tone of the market has strengthened materially. Liberal transactions are reported, both for Irons for immediate use and for future delivery. The amounts disposed of during the past week have given the Pig-Iron market the best showing it has had for three months. Offers of Iron, not quite standard, at very low prices, have been withdrawn and stocks of all kinds are more firmly held. Dealers are to-day talking of declining orders for certain kinds of Iron, the heavy demands of the past ten days having gone a long way toward clearing up production. No. 1 strong Foundry Bessemer Iron is in the best demand at \$17.50 @ \$18.25. No. 1 American Scotch is quoted at \$17.50 @ \$18; No. 1 Soft Silvery, \$17.50 @ \$18.50 and

Lake Superior Charcoals, all numbers \$20.50 @ \$21.50.

Old Rails.—A sale or two of Old American at \$20.50 comprises the business done during the week. Old Wheels are worth \$19.50.

Nails.—Steel Nails, at \$2.60 7/8 keg, have sold freely. No change in the quotations for Iron and Steel Nails.

Pittsburgh.

Office of The Iron Age, 77 Fourth avenue,
PITTSBURGH, PA., July 10, 1888.

As regards the Iron lockout the outlook is more favorable for the iron-workers than the manufacturers. A number of firms here and elsewhere have signed the scale as presented by the Amalgamated Association during the past week and it is expected that others will do likewise before long or as soon as they get their mills repaired and ready for business. Quite a number of firms—and some of them the larger ones—are still holding out.

The outlook for fall trade is improving. Reports from nearly all sections indicate good crops and this is encouraging.

Pig Iron.—The dullness noted for some times past continues, but the prospect for an increased demand is better than it was a week ago, for the reason that several firms have signed the scale and either started up or will do so within a few days; moreover, it is probable that as soon as necessary repairs to mills are made other firms will sign and start up. However, trade in Pig Iron at present is very dull, and to furnacemen prices are exceedingly unsatisfactory; some furnaces have blown out and others will do so as soon as they have worked up their stock of raw material. Consumers not only here, but throughout the entire district, are very low in stock, and as soon as the mills are started up they will be obliged to replenish. Prices as compared with those of a week ago remain unchanged, as follows:

Neutral Gray Forge.....	\$14.00 @ \$14.50, 4 mos.
All Ore Mill.....	15.00 @ 15.50 "
White and Mottled.....	13.50 @ 14.00 "
No. 1 Foundry.....	16.50 @ 16.75 "
No. 2 Foundry.....	15.75 @ 16.00 "
No. 3 Foundry.....	14.75 @ 15.00 "
Charcoal Foundry.....	22.00 @ 24.00 "
Cold Blast Charcoal.....	25.00 @ 28.00 "
Bessemer.....	17.00 @ 17.50 "

Bessemer Iron continues to hold at the recent advance; sale of 1000 tons reported at \$17.25, cash. There is an evident intention on the part of some one here to bear the market for Bessemer by making a report of sales at \$16.50, cash, which is from 50¢ to 75¢ below the ideas of furnacemen, and, so far as we can learn, no reliable sales have been reported below our quotations.

Muck Bar.—But very little doing; buyers are scarce and sellers are not very numerous, even at present prices, \$26 @ \$26.50, cash.

Manufactured Iron.—The demand for all kinds of Merchant Iron continues light, and that for specialties is nothing to brag of; however, trade is nearly always rather quiet at this particular time, and there will doubtless be an improvement before the close of the present month. Prices remain unchanged, but to manufacturers unsatisfactory; Bars, \$1.70 @ \$1.80; Plates, \$2.10 @ \$2.20; No. 24 Sheet, \$2.70 @ \$2.80, all 60 days, 2 % off for cash. There is nothing like the demand for Skelp Iron there was a year ago, when some of the mills had all they could do.

Nails.—The demand continues light, and, while it is hoped that there will soon be a change for the better, the outlook is not as encouraging as it might be. Manufacturers report orders scarce, and that even at full card rates the margin for profit is small. Prices are still quoted upon a basis of \$1.90 for 12d to 40d

in carlots and upward, 60 days, 2 % off for cash. It looks as if the Nail trade would soon be a thing of the past so far at least as regards Pittsburgh; some manufacturers have abandoned it altogether.

Wrought-Iron Pipe.—This important branch of the Iron trade continues in a depressed and unsatisfactory condition; orders continue few and far between, and some of the mills have been shut down for several weeks. The great trouble is that but little is being done in the way of oil and natural gas development, and there is but comparatively little Pipe wanted in consequence. What makes it still worse is that in addition to a very materially reduced demand the capacity for making Pipe has been materially increased within the past two years.

Old Rails.—Continue dull, but, with a good supply and light offerings, there has been no further change in prices. We continue to quote American at \$21 @ \$21.50, with a sale of 500 tons reported at \$21.25. There has not been a sale of Foreign Rails reported in this market for several months, having been supplanted by American, which, in addition to being cheaper, have the preference at the same price.

Steel Rails.—There have been no sales reported here recently. Former prices are still quoted by manufacturers, but the probability is that desirable orders can be placed for less.

Billets, &c.—There is a fair business being done in Bessemer Steel Billets, with but little change recently in prices. Sales of some 6000 tons reported at \$28 @ \$28.25, cash, delivered at buyers' works. We can also report a sale of Sheet Blooms at \$29, delivered. There was a sale of 1000 tons domestic Rail Ends on private terms, understood to be considerably below \$17. American Steel Wire Rods are quoted at \$41.50 @ \$42.50.

Merchant Steel.—There are no new features to note; business continues light, while prices remain unchanged. Best brands of Tool Steel, 8½¢; Crucible Spring, 4½¢; Crucible Machinery, 5¢; Open-Hearth Machinery, 2½¢. The Steel mill of Singer, Nimick & Co. has been started up non-union.

Railway Track Supplies.—The demand for everything in this line continues light for the season, and desirable orders could probably be placed at prices below our quotations. Spikes, \$2 @ \$2.10, 30 days, delivered; Splice Bars, \$1.80 @ \$1.90; Track Bolts, \$2.85 with Square and \$2.95 with Hexagon Nuts. The mills here making a specialty of these report business as having been dull all this year.

Old Material.—There is no improvement in demand, and prices are weak and drooping. There is but little doing, and it is difficult to give reliable quotations in consequence. We quote nominally at \$19 @ \$20, net ton, for No. 1 Wrought Scrap; \$12 @ \$13 for Wrought Turnings; \$23 @ \$24 for Car Axles; \$11 @ \$12 for Cast Borings, gross ton; Cast Scrap, \$14.50 @ \$15, gross.

New York.

Office of *The Iron Age*, 66 and 68 Duane St.,
New York, July 11, 1888.

American Pig.—As is natural immediately after the opening of July, business has been exceedingly dull during the past week, only moderate transactions being reported at fairly steady prices. There is considerable pressure to sell Mill Irons suitable for puddling, a northern Gray Forge having been offered for this purpose at \$14.60, at tidewater, the river freight probably being exceptionally low. Gray Forge for foundry purposes is not, how-

ever, available at such a figure. We quote for standard and choice Northern Irons, tidewater delivery, \$17.50 @ \$18.50 for No. 1 Foundry, \$16.50 @ \$17.50 for No. 2 Foundry and \$14.75 @ \$16 for Gray Forge. A good many foundries stop for repairs for a few weeks early in July, and the current consumption is therefore probably lighter than usual.

Scotch Pig.—The market is very dull, and we quote, nominally, Coltness, \$19.75 @ \$20; Summerlee, \$19.50 @ \$19.75; Langloan, \$19 @ \$19.50, and Dalmellington, \$18 @ \$18.50.

Spiegeleisen.—We can report the sale of 5000 tons of English 20 % at the range of \$27 @ \$27.25 to an Eastern mill.

Bar Iron.—The market is quiet, and we continue our quotations for carload lots on dock, half extras, Common Iron, 1.6¢ @ 1.65¢; Medium, 1.65¢ @ 1.7¢, and Refined, 1.75¢ @ 1.8¢.

Structural Iron.—No transactions of any magnitude have been placed lately in this market, and there are none of any size in sight. We quote: Bridge Plates, 1.9¢ @ 2¢; Universal Mill Plates, 2¢, delivered; Angles, 2¢ @ 2.2¢; Tees, 2.5¢ @ 2.7¢, and Channels and Beams, 3.3¢, on dock.

Plates.—We quote: Tank, 1.9¢ @ 2¢; Shell, 2.15¢ @ 2.30¢; Steel Tank, 2.4¢ @ 2.15¢; Shell, 2.15¢ @ 2.25¢; Flange, 2.6¢ @ 2.75¢, and Fire-Box, 3¢ @ 3.25¢.

Steel Rails.—The market is exceedingly dull, no transactions of any magnitude whatever having been reported. We continue to quote, nominally, \$30 for moderate lots at Eastern mill. In the West apparently very little business has been done during the past week. The meeting of the Rail Makers' Association is to be held at Long Branch on Thursday, August 2.

Wire Rods.—We continue to quote, with little business transacted, \$40 @ \$40.50 at tidewater. It is reported that one of the leading importers of Wire Rods has, during the past month, purchased considerable American Rods in the West to fill contracts with Western consumers.

Old Rails.—Practically no business has been reported, a few small lots, spot and Sound ports, being offered at \$20 @ \$20.50 for T's, with no demand.

Fastenings.—The market is very dull, with Spikes at \$2 @ \$2.05, delivered, and Angle Bars, 1.85¢ @ 1.9¢, delivered.

Metal Market.

Copper.—Steadiness has characterized the London market since our last week's report, and a rising tendency our own. In London on Thursday of last week Spot Chili Bars opened at £81. 2/6, and futures at £78, closing yesterday at £81 and £78 respectively, sales aggregating 350 tons, while here it at first appeared as though the syndicate were manipulating the market preparatory to effecting another sale to manufacturers, but the stiffening tendency gained strength later on by the covering of shorts, alarmed by the meager offerings. A couple of hundred thousand pounds were thus sold, comprising 25,000 lb November at 16.40¢; 25,000 lb December at 16.25¢, and January at 16¢; 75,000 lb at 16.90¢ July; 16.90¢ September, and 16.30¢ December, and closing yesterday with 100,000 lb July at 16.85¢. London cables steadiness to-day at £81, spot, and £78, three months. Best Selected rose from £75. 10/ to £76. Our market closes dull, but firm to-day with sales of 500,000 lb September at 16.60¢. During the first 11 months of the fiscal year there were shipped from the United States 22,504,785 lb of Ingot Copper, against 17,240,296 lb the year before.

The work of unwatering the Calumet and Hecla Company's mine is now progressing quite satisfactorily. The trouble with them was due to the water in the mine being too hot to condense the steam of the Worthington condensing pumps rapidly enough, but these are now doing good work. On the Paris Stock Exchange Rio Tinto shares rose toward the close of last week 7½ francs. The predictions from London that the French Copper syndicate is on the eve of collapsing for financial reasons are taken no notice of on this side, as in England the metal trade has been inimical to the syndicate all along. Spanish exportation of Pyrites the first four months has been 270,754 tons, against 266,679 in 1887 and 233,555 in 1886; of Precipitate 10,164 tons, against 9823 and 8125.

Tin.—The favorable statistics of the close of last month have had the effect of developing a strong upward movement during the week, winding up with a recoil. On Thursday last London opened at £84. 10/, spot, and £84. 15/, futures, advancing the next day to £86 and £86. 17/ respectively, but receding to £82. 10/ and £83 yesterday, the total sales summing up 1150 tons. Here the market followed closely, the sales made in succession being 20 tons spot at 18.85¢; 10 tons July at 18.90¢; 40 tons at 19¢ for spot and 19¢ July; 20 tons August at 18.60¢ @ 18.65¢, and yesterday 60 tons at 18.20¢ for July, 18.10¢ @ 18.25¢ for August, and 18.05¢ for September. This morning London again gives way slightly, to £81. 5/ spot and £82 futures, while our own market closes unsettled, with a sale of 10 tons August at 18¢. The import of Tin into the United States during the first 11 months of the fiscal year has been 29,131,506 lb, against 28,584,560 lb in 1887. The June shipments from the Straits to this country were 200 tons, against 650, June, 1887; to England 1000, against 1200. Since January 1 they were respectively 850 tons, against 2600, and 10,000, against 6600. **Tin Plates.**—The rise in Tin brought more business by bringing in parties who were ready to operate before it took place, and considerably more was done in futures. The spot market remains unaltered; stocks are low, but the demand is light. The import of Tin Plates into the United States during the first 11 months of the fiscal year has been 573,543,195 lb, against 512,251,317 during the corresponding period of the previous year. We quote at the close, large lines, on the spot: Siemens-Martin Steel, Charcoal finish, \$5 @ \$5.25; ditto Coke finish, \$4.80; Ternes, \$4.80 @ \$4.40; Bessemer Cokes, \$4.50 @ \$4.60, and Wasters, \$4.35 @ \$4.40. Coke Tins are selling at 13/ in Liverpool, for prompt delivery.

The London *Mining Journal*, in its issue of June 30, remarks: "After a long and weary struggle during the period of inflated prices of Tin, it is gratifying to note that this industry has not only recovered its normal position, but that there is a marked improvement in the trade both as regards volume and prices. The exports last year were the largest on record, but for the first five months of this year in comparison with the same period of 1887, as shown by the Board of Trade returns, there has been an increase of 6 %. The increases are most marked in the exports to Germany and to the United States. The latter country is by far our best customer, taking 76 % of the exports and over 52 % of the total make of this country. The relative improvement in prices is shown by comparison with those current early in the autumn of last year, when uninfluenced by the Tin question. Thus it may be noted that the price of Bessemer Steel Coke Plates, which is one of the brands in most active demand, was in September officially quoted at 13/ @ 13/3 per box of IC, and Straits Tin at

an average of about £102 $\frac{1}{2}$ ton. The present quotation for Plates is the same, with foreign Tin at about £82. This difference in Tin would mean nearly 6d. $\frac{1}{2}$ box intrinsic value. The improvement is to be accounted for by the active demand which has naturally followed the period of high prices and stagnation, and by the advantages which makers are reaping by direct shipments from Swansea, the home of the industry. It is somewhat to be regretted, however, that the revival has been followed, even in this brief space, by signs which threaten the trade with its ever-recurring evil of overproduction. Already we hear of the erection of new mills and of extensive additions to existing works.

Lead.—About 1000 tons Common Domestic were sold during the week in the open market at 4¢ @ 4.10¢, but the price at the close is 4.05¢ flat, there being sellers, but no buyers at this. At the Metal Exchange some 565 tons were sold since last Thursday at the following prices: July, 4.07½¢ @ 4.10¢, and August at 4.12½¢, closing at 4¢ @ 4.05¢. In Europe, meanwhile, there have been advancing markets under rumors that the syndicate to be formed is in a fair way of constituting itself, yet not much reliance is placed on these rumors on this side. Stolberg and the other German companies apprehend a thorn in their sides from the two Lead refineries going into operation at Antwerp, and try to get up a syndicate in which the Belgians are to become members in order to counteract or prevent the competition they fear at the latter's hands. This is about all, and the outlook is extremely dim; but the London operators, who will catch at a straw, dive in and raise the price £1 $\frac{1}{2}$ ton, Soft Spanish coming £13 and English Pig £13/5. Both Chicago and St. Louis have been firm at 3.85¢. The export of Pig Lead from Spain during the first four months has been 44,461 tons, against same time last year 42,972, and 38,187 in 1886.

Spelter and Zinc.—Only a moderate demand has been noticeable on the spot at 4½¢, Common Domestic, while Silesian may be quoted 5¢ @ 5½¢, having improved in London during the week from £14. 15/ to £15. 15/.

Antimony.—Hallett gave way in London from £40 to £39, and is selling moderately here at 10¢ to 10½¢, while Cookson remains steady at 13½¢ @ 13½¢.

New York Metal Exchange.

The following sales are reported:

THURSDAY, July 5.	
82 tons Lead, July.....	4.10¢
20 tons Tin, spot.....	18.55¢
10 tons Tin, July.....	18.90¢
25,000 lb Copper, November.....	18.40¢
100 tons Lead, July.....	4.07½¢
FRIDAY, July 6.	
80 tons Tin, spot.....	19.00¢
16 tons Lead, July.....	4.10¢
10 tons Tin, July.....	19.00¢
25,000 lb Copper, December.....	18.25¢
25,000 lb Copper, January.....	18.00¢
100 tons Lead, August.....	4.12½¢
100 tons Lead, July.....	4.05¢
16 tons Lead, spot.....	4.05¢
10 tons Lead, July.....	4.05¢
50 tons Lead, July.....	4.06¢
16 tons Lead, July.....	4.04¢
16 tons Lead, July.....	4.07½¢
116 tons Lead, August.....	4.10¢
MONDAY, July 9.	
25,000 lb Copper, July.....	16.90¢
25,000 lb Copper, December.....	16.30¢
10 tons Tin, August.....	18.65¢
10 tons Tin, August.....	18.65¢
25,000 lb Copper, September.....	16.60¢
TUESDAY, July 10	
10 tons Tin, July.....	18.20¢
20 tons Tin, August.....	18.30¢
10 tons Tin, August.....	18.25¢
100,000 lb Copper, July.....	16.85¢
10 tons Tin, August.....	18.10¢
10 tons Tin, September.....	18.05¢
WEDNESDAY, July 11.	
50,000 lb Lake Copper, September.....	16.60¢
10 tons Tin, August.....	18.00¢

Coal Market.

There is comparatively little new business offering, but there is more doing in the way of delivery on former orders, and a perceptible renewal of inquiry with reference to laying in future supplies. The wholesale operators are evidently anticipating an increased demand at an early date, production at the mines having been pushed with unwonted vigor during the last few days. The Lehigh region suddenly increased its output from 87,000 tons to 172,000 tons, and the Lackawanna from 292,000 tons in the previous week to 348,000, and this despite the Fourth of July interruption. This looks like confidence in the situation, not only in regard to future consumption, but as regards ability to maintain prices. It is understood that prices now realized approximate more closely to the schedule, and there is full reason for the belief that the proposed advance on or about July 15 will take effect. According to report the advance will be 10¢ on Broken, 15¢ on Egg and 25¢ on Stove and Chestnut, or about an average of 15¢ @ 20¢ $\frac{1}{2}$ ton. The question will be finally decided on Friday. The Philadelphia *Ledger* says: "Within the past week the movement of Coal eastward has been accelerated by the increased supply of vessels, and the demand from that quarter is daily improving. The Boston market is reported as much brighter and the demand for Coal increasing. The stocks of Anthracite at tidewater shipping points are beginning to decrease. A few weeks ago there was in stock at Port Richmond about 180,000 tons of all sizes of Anthracite belonging to the Reading Company, and besides the individual operators had stored there 40,000 tons additional, making altogether 220,000 tons. This unusually large stock at that shipping point has already been heavily reduced, as the total stock at Port Richmond on Saturday was reported at less than 175,000 tons. Reading Pea is in full supply at \$2.50, f.o.b.; can buy Pea as low as \$2.40; Buckshot, \$2 @ \$2.10, f.o.b.

The Anthracite Coal production during the week ended July 7 amounted to 671,382 tons, as compared with 573,572 tons for the same week last year, and for the year 1888 to date the aggregate is 16,969,701 tons, as against 17,195,144 tons for the same time in 1887, a decrease of 225,000 tons. Compared with the previous week the increase is 146,619 tons. Quotations are as follows: Wyoming Free Burning, f.o.b. at South Amboy and Weehawken, Broken or Grate, \$3.75; Egg, \$4; Stove and Chestnut, \$4.25; Reading Hard White Ash, at Port Elizabeth. Lump and Steamboat, \$4.25; Broken, \$4; Egg, \$4.10; Stove, \$4.25; Chestnut, \$4.15; Pea, \$3. Free burning White Ash is the same, except Broken, \$3.75, and Egg, \$4. Lehigh Coals are: For Lump, \$4.50 Broken, \$4.20; Egg, Stove and Chestnut, \$4.10 $\frac{1}{2}$ ton, f.o.b. at the loading ports.

The Bituminous trade is active on old orders. Very few orders have been booked this month.

Financial.

The conviction is becoming more general that business throughout the country is in better shape and in larger volume, taken as a whole, than common report has represented. The depression of which croakers are prone to speak is, with a few notable exceptions, found in speculative articles on the Stock Exchange and among those whose commodities for the most part have only an imaginary existence. Well grounded confidence is felt in abundant crops, of which the assurance is stronger every day. Apprehension of money troubles is for the present dismissed, and al-

though the railroad situation is demoralized by the cutting of rates there are incidental advantages from which the mercantile classes are sure to profit. The wages question, particularly among iron operatives, is a serious drawback. Yet there is a feeling that pending difficulties must soon be adjusted, and that an active fall trade will open in due time. With reference to business prospects President Chauncey M. Depew, of the New York Central, is reported as saying: "I certainly think that business this fall will be very brisk. Indications all point to improving prosperity. You can safely say that the trouble growing out of concessions on dressed beef and live cattle rates has been grossly exaggerated. * * * I feel hopeful because I am convinced that general business is on the mend."

The general markets are quiet. Wheat, after a further advance, is again easier, exporters buying moderately. Corn was offered lower on spot stock. The provision market was disturbed by reports from Europe of the prosecution of owners and manufacturers of lard for alleged adulteration. In cotton there is a desire to sell in prospect of the new crop. The first bale of new crop Georgia cotton was from Albany, Ga., 5th inst., to this city. This is some days ahead in any previous year for the first shipment from that State. Crop accounts generally are encouraging despite meteorological extremes in various sections of an extraordinary character—a snow storm in Minnesota and 120° temperature in Illinois. Harvesting of wheat is in progress as far north as Ohio, Indiana and Michigan. Vice-President Clark, of the Missouri Pacific Railroad, telegraphs from St. Louis that the crops along the entire length of the Missouri Pacific system are of the most promising character, and that the yield of all kinds of produce will be enormous. In Kansas particularly the producers are sanguine of harvesting the largest crops ever gathered in that State. Officials of the Manitoba say that their crop advices continue very favorable from all sections. Vice-President Oakes, of the Northern Pacific, telegraphs that the crop prospects along his road are the finest ever known on the line.

The weekly statement of the Associated Banks showed a further decrease of \$2,500,425 in excess of reserve, which is now \$24,316,800; at the corresponding time in 1887 the excess was only \$6,352,450. Specie showed an increase of \$272,600, legal tenders decreased \$1,378,000. In loans there was a further expansion of \$3,890,900. Deposits increased \$5,580,100.

The exports of specie during the week were \$343,000, but Wednesday's steamer takes out \$1,000,000 in addition to Germany on a special order. Since January the exports amount to \$21,039,000, or about double those of the corresponding period last year.

Up to date the Secretary of the Treasury has purchased under the April circular \$18,452,400 4% and \$8,398,550 4½% bonds. These bonds cost the Government \$32,474,458, but the saving to the Government over what it would have cost to redeem them at maturity aggregates \$9,892,335.

The changes that have occurred in money circulation during the year are much less than are commonly supposed. Of the coin issues gold has increased by more than \$15,000,000, and silver, standard dollars and fractional, has increased by \$3,000,000. Of the paper issues United States notes have decreased by \$18,000,000, and national bank notes by \$31,500,000; while silver certificates have increased by \$58,000,000 and gold certificates by \$28,500,000. Thus the coin circulation of all kinds has been expanded by \$18,000,000 and the note circulation by \$37,060,000.

According to the Treasurer's report there were more gold certificates in circulation on June 30 than there has been at the end of any month since September, 1885, the amount being 119,887,370. The silver certificates in circulation on that day amounted to \$200,387,376, the highest figure ever reached. The coinage of the Bland silver dollar has reached nearly \$300,000,000, the exact figures being \$299,424,790. Of these only \$55,545,303 were in circulation on June 30, which is a trifle more than were in circulation at the end of the fiscal year 1886-87.

The imports of merchandise at this port are again heavier, the total for the week being valued at \$9,986,000, of which \$2,556,000 represents dry goods. Since January 1 the total is \$250,143,000, as compared with \$245,789,000 for the same time last year and \$225,000,000 in 1886. The exports for the week were \$5,214,657.

Twenty-five banks have now entered the new system by which deposits are made at the Sub-Treasury in the morning, against which checks can be drawn throughout the day for the payment of customs duties. The chief advantage of the system is that it relieves banks and importers of the risk and trouble of carrying the actual cash to the Custom-House. The banks which have adopted this new method include nearly all those whose customers have extensive Custom-House transactions. In view of the relations of the Sub-Treasury and Clearing-House banks, and their interdependence and mutual obligations, it is believed that no possible risk would be involved in the acceptance by the Collector of checks certified by national banks.

The Stock Exchange markets show an improved tone. On Thursday coal shares were strengthened by the impending advance in the price of coal. The report that the Iowa rate sheet would take effect at once had no influence. On Friday it was understood that the United States Court would restrain the Iowa commissioners, whereupon St. Paul and Northwestern advanced, and other grangers were stimulated. On Saturday and Monday strength was imparted by higher prices in London, although Missouri Pacific was pressed for sale on a report that Gould had put on the market about \$15,000,000 of stock. The only news of importance was that the Canadian Pacific had stopped cutting rates on dressed beef and live stock, and that the road would advance the tariff on Monday next.

On Tuesday there was a better feeling than for a long time. The Bureau reports, showing both winter and spring wheat and corn to be in improving position, were used to advance the grangers. Compared with the June report, an improvement of 2.3 % is shown in winter wheat and 3.1 % in spring wheat.

The following shows the bid quotations for Government bonds:

U. S. 4½, 1891, Registered.....	107¼ @
U. S. 4½, 1891, coupon.....	107¼ @
U. S. 4, 1907, registered.....	127¼ @
U. S. 4, 1907, coupon.....	127¼ @
U. S. Currency 6s.....	119 @

Bank clearances in 38 cities last week show a decrease of 1.1 %, compared with the same week last year, against a decrease of 34.1 % the previous week. Outside of New York there was an increase of 13.5 % as compared with last year, against a decrease of 15.3 % the previous week. In accounting for differences the present decreased volume of speculation must be considered.

Money on call, 1½ %. Time loans on good collateral are quoted as follows: Three months, 3 %; six months, 4 %, and good double-name paper is readily placed at 4 % @ 4½ %. There is very little offering.

Sterling exchange quiet and steady. Nominal asking rates unchanged at \$4.87½ @ \$4.89½.

Imports.

The imports of Iron and Steel, Hardware, &c., at this port from June 29 to July 5, inclusive, and from January 1 to July 5, inclusive, were as follows:

Iron and Steel.

	June 29 to July 5, Tons.	Jan. 1 to July 5, Tons.
Iron Ore: Co-mack & Co.....	1,022	1,022
Pig Iron: Naylor & Co.....	285	8,475
G. W. Stetson & Co.....	50	10,750
Spiegelisen: Naylor & Co.....	406	4,785
W. H. Arkell.....	50	50
Steel: W. F. Wagner.....	54	813
Montgomery & Co.....	12	60
N. Cohn & Co.....	10	152
F. S. Pilditch.....	8	253
Newton & Shipman.....	5	104
O. Huggill.....	5	155¼
C. F. Boker.....	2	119¼
Steel Rods: Dana & Co.....	600	1,181
Naylor & Co.....	105	11,105
Cary & Moen.....	27	554
Steel Sheets: Pierson & Co.....	21	502
Steel Hoops: A. R. Whitney & Co.....	163	1,868
Scrap Iron: M. R. Tonsiea.....	120	120
Jas. E. Ward & Co.....	50	100
Swedish Rough Bars: C. V. Philp.....	39	89
Iron Blooms: C. V. Philp.....	5	5
Cotton Ties: Collins & Co.....	550	550
Har Iron: C. V. Philp.....	40	40
Iron Beams: R. F. Downing & Co.....	6	171

Tin Plates.

	Boxes.	Boxes.
Phelps, Dodge & Co.....	18,808	258,041
Bruce & Cook.....	7,457	53,779
Dickerson, Van Dusen & Co.....	3,678	189,470
A. A. Thomsen & Co.....	3,871	58,386
Central Stamping Company.....	3,576	16,736
G. B. Morewood & Co.....	3,000	18,989
Pratt Mfg. Company.....	3,181	85,570
Merchant & Co.....	2,810	8,816
S. Shepard & Co.....	2,074	10,909
N. L. Cort & Co.....	2,031	57,884
Hy Whittemore & Co.....	1,694	39,589
Lombard, Ayres & Co.....	784	5,528
T. B. Coddington & Co.....	421	80,889
Stroud & Co.....	844	686
E. S. Wheeler & Co.....	290	969
C. S. Mersick & Co.....	101	4,242
Lalanc & G. Mfg. Co.....	63	955

Metals.

	Pounds.	Pounds.
Tin: Muler, Schall & Co.....	492,317	5,292,824
R. Crooks & Co.....	2,809	20,809
D. Thomsen & Co.....	11,206	115,363
Spelter: J. Osgood.....	92,565	92,595

Hardware, Machinery, &c.

Boker, Hermann & Co., Arms, cs., 29; Hdw., bxs., 5; Mds., cs., 5	
Clark Mill End Company, Mach'y, pkgs., 17	
Field, Alfred & Co., Hdw., cs., 1; do., cs., 19	
Folsom, H. & D., Arms, cs., 7	
Funche, Edyo & Co., Mach'y, cs., 5	
Graef Cutlery Company, Cutlery, cs., 4	
Hermann, Auckam & Co., Mach'y, cs., 20	
Hawkes, T. G., Wheels, cks., 3	
Mart & Co., Hdw., pkgs., 11	
McDermott, Walt, Forged Steel Shoes, 5	
Merchants' Dispatch Company, Arms, cs., 3	
Meriden Cutlery Company, Mds., cs., 2	
Pim, Forwood & Co., Sugar Pans, 2	
Sanderson & Son, Mach'y, cs., 1	
Schoverling, A., Mds., cs., 31	
Schoverling, Daly & Gales, Mds., cs., 12	
Streace, G. L., Skillets, 100	
Taylor, Thos., Mds., cs., 35	
Tiebout, C. H. H. & Sons, Anvils, 24	
Wiebusch & Hilger, Lim., Arms, cs., 12; Anvils, 27; Mds., cs., 7	
Witte, John G. & Bro., Cutlery, cs., 7	
Order: Mach'y, cs., 23; Cutlery, cs., 6; Hdw., cs., 7	

Irons and Metals Warehoused from June 29 to July 5, inclusive.

	Tons.
Spiegelisen: Crocker Bros.....	301

Exports of Metals.

	June 2 to July 5, Pounds.	Jan. 1 to July 5, Pounds.
Copper: J. Abbott & Co.....	366,133	6,200,928
Lewisohn Bros.....	3,879,022	2,581,293
F. A. Lomal.....	4,842,453	228,989
American Metal Co.....	112,000	112,000
G. H. Nichols.....	560,000	110,376
J. Bruce Ismay.....	440,000	224,064
S. Mendel.....	112,025	112,025
Ledoux & Co.....	1,280	224,581
Muller, Schall & Co.....	125,000	765,880
Copper Queen Con. M. Co.....	67,500	112,000
J. Kenn-dy, Tod & Co.....	250,000	6,260
H. Beezer & Co.....	189,964	1,812,649
Orford C. & S. Hfg. Co.....	29,933,905	3,021,510
Robt. M. Thompson.....	1,272,563	295,000
Thos. J. Pope, Sons & Co.....		
J. Parsons & Co.....		
Bridgeport Copper Co.....		
C. Herold.....		
Phelps Bros.....		
R. W. Jones.....		
Copper Matte: Williams & Terhune.....		
Lewisohn Bros.....		
American Metal Company.....		
J. Abbott & Co.....		

C. Ledoux & Co.....	458,800
F. W. J. Hurst.....	184,288
G. H. Nichols.....	722,777
H. T. Nichols & Co.....	180,095
Old Brass: Burgess & Co.....	11,300 2,8,298

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]
LONDON, WEDNESDAY, July 11, 1888.

The market for Block Tin has agitated, first advancing sharply, to the surprise of most speculators, and subsequently reacting nearly as rapidly. The rise was due in a good measure to the fact that a large portion of the deliveries early in the month went to consumers, who bought heavily when prices were near the lowest point, thus disappointing speculative "shorts," who had calculated upon a large amount of Tin coming on the market. This caused uneasiness, which in turn was intensified by continued reports of consumers storing stocks in the colonies instead of selling, as customary. Hence a lively demand to cover and the rapid advance in prices. The upward movement brought out considerable stock from exporters at the primary points, and that, together with realizations by local holders, resulted in the subsequent decline after the major portion of the "shorts" were covered. The market is now in a very sensitive condition, greatly facilitating manipulation.

Operations in Chili Bars have been on a very moderate scale, and prices have undergone only slight change during the week. The movement referred to last week to change the form of contracts so that other Copper than Chili Bars may be a good delivery has resulted more satisfactorily than was anticipated. It has been decided to admit a number of brands equal or superior, but the form of contract has not yet been framed by the committee chosen for that purpose. However, some 800 tons have already changed hands under the new rule, the syndicate taking it at, it is understood, £69 for three months' futures.

The Tin-Plate market has been quiet pending the quarterly meeting and prices are practically the same as current last week. The exports to the United States last month were 23,000 tons, or 2000 tons less than during June a year ago.

There is very little change in the Pig Iron trade, save that a start has been forced in the direction of reduced production in Scotland, four furnaces there having been blown out the past week. There is no outside interest in warrants at the present time, and operators within the trade are disinclined to make a decided move. In the Middlesboro' product, however, there continues to be a brisk trade. Last month's exports of Pig Iron were only 13,000 tons, against 44,000 tons in June, 1887.

Scotch Pig.—Prices have raised but slightly and business has continued slow:

No. 1 Coitness, f.o.b. Glasgow.....	47/
No. 1 Summerlee, " ".....	46/6
No. 1 Gartsherrie, " ".....	44/
No. 1 Langloan, " ".....	44/
No. 1 Cambro, " ".....	39/8
No. 1 Shotts, " ".....	45/
No. 1 Glenarnock, " ".....	43/
No. 1 Dalmellington, " ".....	39/6
No. 1 Eglinton, " ".....	38/

Steamer freights, Glasgow to New York, 5/; Liverpool to New York, 7/6.

Cleveland Pig.—The market very firm, without, however, any increased activity. No. 1 Middlesboro', G.M.B., 84/; No. 3 do., 81/9.

Bessemer Pig.—Prices are held firmly, but business is only fair. West Coast brands, mixed numbers, 48/, f.o.b. shipping point.

Spiegeleisen.—The market continues firm, with demand good. English 20 % quoted 80/, f.o.b. N. W. England shipping point.

Steel Rails.—There has been no material change in this department. Standard sections quoted at £3. 17/, f.o.b. at N. W. England shipping point. Mid-lesboro' district about 2/6 @ 5/ less.

Steel Blooms.—A fair business, but prices still rather weak. We quote at £3. 18/6 for 7 x 7, f.o.b. at N. W. England shipping point.

Steel Billets.—A steady market, with the demand running fair. Bessemer, 2½ x 2½ inch, £3. 16/, f.o.b. at N. W. England shipping point.

Steel Slabs.—Only moderate sales making, but prices steady. Bessemer, £3. 19/3, f.o.b. at N. W. England shipping point.

Steel Wire Rods.—Values are weaker and the demand is slow. Mild Steel No. 6 quoted at £5. 12/6 and No. 5 at £5. 10/, f.o.b. at N. W. England shipping point.

Old Rails.—Demand very slow and prices weaker. Tees quoted at £2. 12/6, and Double Heads £2. 17/6, c.i.f., New York.

Scrap Iron.—Market continues dull and prices are nominal. Heavy Wrought at £2. 7/6, f.o.b.

Crop Ends.—Very little inquiry. Former prices asked. Bessemer quoted £2. 5/ @ £2. 7/6, f.o.b.

Tin Plate.—A fair trade at about former prices. We quote, f.o.b., Liverpool:

IC Charcoal, Allaway grade	.....	14/6 @ 15/
IC Bessemer steel, Coke finish	.....	12/9 @ 13/
IC Siemens	.....	18/3 @ 18/6
IC Coke, B. V. grade	.....	12/9 @ 13/
Charcoal, Terne, Dean grade	.....	12/6 @ 12/9

Manufactured Iron.—The market steady with trade fair. We quote, f.o.b. Liverpool:

Staff. Ord. Marked Bars	.....	4 17 6 @ 5 0 0
Common	.....	4 17 6 @ 5 0 0
Bl'k Sheet, singles	.....	4 12 6 @ 4 10 0
Welsh Bars (f.o.b. Wales)	.....	4 12 6 @ 4 10 0

Tin.—Market closes strong after considerable fluctuation. Straits quoted at £83 @ £83. 10/, spot, and £83. 7/6 for three months' futures.

Copper.—Dealings moderate, but prices fairly well maintained. Chili Bars closed at £81, spot, and £78. 2/6, three months' futures. Best Selected, £75, nominal.

Lead.—There has been a good business at better prices. Soft Spanish, £13 at the close.

Spelter.—Demand more active and the market strong. Silesian, ordinary, £15. 15/ @ £15. 17/6 at the close.

The Llynvi Tondy Works collieries have been purchased by Colonel North for £150,000.

Sparrow's celebrated Ffrwdd Works, at Wrexham, which have been idle for several years, are about to be restarted.

A plan has been submitted for supplying Paris with pure water from the lake of Neufschatel, at a cost of \$100,000,000. The proposed aqueduct would be 312 miles in length, including a tunnel 22 miles long under the Jura mountains. The lake is 1620 feet above the average of Parisian streets.

The Western Wages Scale.

With the exception that three or four more firms have signed the scale, the condition of the lockout in the Western iron mills presents no new features from those noticed in our issue of last week. It is claimed, however, by the officials of the Amalgamated Association that they have reliable advices to the effect that several more firms will sign during the present week and that they have no fear as to the final outcome of the struggle. The developments during the first week of the lockout would seem to bear out this opinion, as up to Monday, the 9th inst., the following named firms had signed the Amalgamated scale:

Laughlin and Junction Steel Company, Mingo Junction, Ohio.

Akron Iron Company, Akron, Ohio.

Apollo Iron and Steel Company, Pittsburgh, Pa.

Cleveland Hardware Company, Cleveland, Ohio.

Aurora Iron Company, Aurora, Ind.

Maumee Rolling Mill Company, Toledo, Ohio.

Oliver Brothers & Philips, Pittsburgh, Pa.

Lookout Iron Company, Chattanooga, Tenn.

P. H. Laufman & Co., Limited, Apollo, Pa.

Carnegie, Phipps & Co., Limited, for the Twenty-ninth Street Iron Works, Union Iron Mills, and the Homestead Steel Works.

Findlay Iron and Steel Company, Findlay, Ohio.

Findlay Rolling Mills Company, Findlay, Ohio.

Republic Iron Works, Limited, Pittsburgh, Pa.

Scottdale Iron and Steel Company, Limited, Scottdale, Pa.

Moorhead Brother & Co., Pittsburgh, Pa.

Anchor Iron and Steel Works, Newport, Ky.

Lawrence Iron and Steel Company, Iron-ton, Ohio.

Summers Brothers & Co., Struthers, Ohio.

Linden Steel Company, Limited, Pittsburgh, Pa.

New Albany Rail Mill Company, New Albany, Ind.

Kittanning Iron Company, Limited, Kittanning, Pa.

The last-named firm signed the scale on Saturday, the 7th inst., and is the last signature reported at this writing. The report published in some of the Pittsburgh papers that the nail manufacturers had signed the nailers' scale is incorrect. There are but three firms in Pittsburgh that are engaged in the manufacture of nails, these being Shoenberger & Co., Chess, Cook & Co. and Jones & Laughlins, Limited. None of these firms have signed the scale. Chairman Keating also denies the statement that a meeting of the Manufacturers' Association has been called for the purpose of discussing the present situation of affairs. No meeting has been called, nor will there be one held, unless future developments make it necessary.

Among newly authorized corporations in the State of Illinois is the following: Paige Iron Works, capital \$25,000; to purchase iron, steel, copper and other metals, and to manufacture articles from same; incorporators, John Crerar, Edward S. Shepherd and Alonzo W. Paige.

The Junction Iron Company, of Mingo Junction, Ala., have just contracted for a new blast furnace, 17 x 75 feet, with J. P. Witherow, the well-known engineer and contractor, of Pittsburgh, Pa. It is to take the place of one of their former fur-

naces, and is not an additional one in the sense of increasing the company's plant. The firm have also contracted with Mackintosh, Hemphill & Co. for an additional blowing engine for immediate erection. When all is completed, however, the company will operate but one furnace, as has been their custom in the past.

Washington News.

(From Our Regular Correspondent.)

WASHINGTON, D. C., July 10, 1888.

The tariff discussion in the House still lags along, notwithstanding occasional spasmodic efforts to facilitate its weary way through the parliamentary hopper. The optimistic reasoners have been arguing for the last month that the bill would be passed by the middle of July. The pessimistic philosophers are still claiming September or later. The most anxious part of the situation just now is as to the ability of Mr. Mills and his friends to pass the bill at the end of the debate. In order to ascertain within the range of a reasonable judgment in the premises, a canvass has been made which shows that the prospects are not certain. After all the amending and threatening and conceding and lashing the chances are doubtful, although there are those who think that the bill ought to pass, not as an economic measure, but for political considerations on both sides. The Democratic majority, as is known, is 15. To change the result on a full vote would require eight votes with the solid Republican strength. Based upon this elementary proposition comes the fact that the measure, whatever may be its fate, will not have any votes to spare on either side.

The canvass of the Democratic vote has developed the fact that the following of their numbers will not vote for the bill: Merriman, of New York City; Greenman, of Troy; Randall, of Philadelphia; Snowden, of Lehigh; Foran, of Cleveland, and Pidcock of the Fourth District of New Jersey. This makes six Democrats who will not vote for the bill. There are two who are in doubt. Vance, of Connecticut, who was "accommodated" to the extent of taking care of screws and cutlery, has always been violently opposed to the bill, but is not so vigorous in his expressions, although he believes the bill will defeat the Democrats in this State. General Tracy, of the Albany district, has also always opposed the bill until recently. Yet he has not said that he will vote for it. This would make the necessary eight to defeat.

On the Republican side the canvass shows but one who will vote for the bill. He is Fitch, of New York. The ranks, otherwise, are claimed to be firm. It is not improbable that a sufficient number will not vote so as to let the bill pass, otherwise the plans of the Republicans will not materialize. They propose to have the House pass their bill and the Republican Senate pass their substitute and then go before the country. The House failing to pass theirs there can be no substitute, as the Senate cannot originate a revenue measure. The Senate proposition will not be ready for several weeks. There have been many parties here who have been heard, but progress has been slow. From present indications the Senate substitute will be somewhat of a modification of the Randall bill. The metal features will be about the same.

The Board of Electrical Control in this city have resorted to summary measures to compel the illuminating companies to put their wires in the ground. The latter respond that the subways are not feasible for their purposes. The case will come up in the courts on the 12th inst.

Hardware.

The volume of business is limited, manufacturers and merchants being generally occupied in making their arrangements for the season's trade. Prices of Hardware in general have not been, as a rule, revised, there being less than the usual number of new discount sheets issued. In several lines of goods there have, however, been changes in price, particulars of which are given below. The market in several lines is not characterized by as much firmness as might be desired, and there has been within the last few weeks a reduction in the price of some leading goods. The general tone is not strong, and merchants and manufacturers are disposed to move conservatively. There is, however, a hopeful feeling prevailing in regard to fall business, which is regarded as likely to be of fair volume.

Cut Nails.

The week has been a very quiet one in the New York Cut-Nail trade, the market remaining unchanged at \$1.90 to \$1.95 for carload lots on dock, and \$1.95 to \$2 for small lots from store. It is stated that there is less shading from these figures by sellers of Nails not recognized as quite up to the standard than there has been for some time.

Wire Nails.

Since our last report there has been no improvement in price and some quotations are a shade lower. The price for carload lots, at factory, may be named at \$2.40 to \$2.50. Moderate lots are selling in this market at \$2.50 to \$2.60 and small lots at \$2.60 to \$2.65.

At a meeting of the Wire Nail Association, held in Pittsburgh several months ago, it was decided that in order to prevent buyers from ordering Standard Nails on a miscellaneous basis that the heading "Miscellaneous Wire-Nail List" should be adopted for all Nails except Standard Nails in kegs, and that Nails provided for in the Standard list should not be sold at a discount from this miscellaneous list. It was also resolved to make the following extras to be added to the list:

$\frac{1}{4}$ -pound papers.....	6 cents.
$\frac{1}{2}$ -pound papers.....	3 cents.
1-pound papers and larger.....	2 cents.
Nails in bulk in wooden boxes.....	1 cent.

These extras to be added to the list before taking off the discount. It was also decided that Nails provided for in the price list of Standard Wire Nails in kegs should not be sold at a discount from the miscellaneous list. It was understood that these changes should go into effect when the Standard card was issued, and now that it has been issued some of the leading Western manufacturers have agreed to be governed by and to announce these provisions.

Miscellaneous Prices.

Shepard Hardware Company, Buffalo, N. Y., have issued a circular giving the following discounts for Surface Blind Hinges and Gate Hinges and Latches:

	Per cent.
Blind Hinges.....	discount.
Gate Hinges and Latches.....	75&10&5

Their assortment of Blind Hinges includes: Shepard's, Noiseless, Niagara, Buffalo, Champion, Steamboat, Clark's (old pattern) and Clark's (tip pattern). The price list is also announced as follows:

	Per dozen
Nos. 1, 10, 30, 50 and 75 (Wood).....	sets.
No. 3 (Brick).....	\$3.50
No. 5 (Brick).....	6.25
No. 60, "Noiseless" (Brick).....	12.50
No. 65, "Noiseless" (Brick).....	6.25
No. 55, "Noiseless" (extra heavy).....	7.00
	15.00

The market for Tire Bolts is somewhat irregular. The base discount of the Port

Chester Bolt and Nut Company and the American Screw Company is 70 per cent., but some of the other manufacturers are still adhering to discount 65 and 10 as the base discount.

The following quotations on Hammers are made by the Hartford Hammer Company, Hartford, Conn., for whom John H. Graham & Co., 113 Chambers street, New York, are agents. The list prices are, it will be remembered, different from those of other manufacturers:

	Dis. per cent.
Adze-Eye Nail Hammers.....	33 $\frac{1}{2}$ &5
Patent Nail-Holding Hammers.....	33 $\frac{1}{2}$ &5
Workman Adze-Eye Nail Hammers.....	33 $\frac{1}{2}$ &5
Workman Adze-Eye Bell-Face Hammers.....	33 $\frac{1}{2}$ &5
Standard Adze-Eye Hammers.....	33 $\frac{1}{2}$ &5
Machinists' Adze-Eye Ball-Pein Hammers.....	50
Machinists' Adze-Eye Straight-Pein Hammers.....	50
Riveting Adze-Eye Hammers.....	50
Farriers' Adze-Eye Hammers.....	50
Horseshoers' Adze-Eye Fitting Hammers.....	50
Horseshoers' Turning Hammers.....	50
Tinners' Riveting Hammers.....	50
Tinners' Panning Hammers.....	50
Riveting Plain-Eye Hammers.....	50
Engineers' Single-Face Hammers.....	50
Engineers' Double-Face Hammers.....	50
Blacksmiths' Hand Hammers.....	50
Coopers' Hammers.....	50
Carriage Ironers' Hand Hammers.....	50
Chipping Hammers.....	50
Machinists' Ball-Pein Octagon Pattern Hammers.....	50
Machinists' Straight-Pein Octagon Pattern Hammers.....	50
Machinists' Cross-Pein Octagon Pattern Hammers.....	50
Brad Hammers.....	50
Tack Hammers.....	50
Boilermakers' Riveting Hammers.....	50
Drilling or Striking Hammers.....	50
Hand Drill or Stonecutters' Hammers.....	50
Masons' Hammers.....	50
Masons' Hammers with teeth.....	50
Napping Hammers.....	50
Tack Claws.....	25
Spalling or Stone Hammers.....	65&10
Blacksmiths' Hand Hammers.....	65&10
Blacksmiths' Sledges.....	65&10
Coal Sledges.....	65&10
Horseshoers' Turning Sledges.....	65&10
Stone Sledges.....	65&10
Stone Axes.....	65&10
Railroad Mauls.....	65&10
Ship or Top Mauls.....	65&10
Woodchoppers' Mauls.....	65&10
Wedges, Truckee Pattern.....	65&10
Wedges, Hartford Hammer Company's Pattern.....	65&10
Railroad Track Chisels.....	65&10
Handles.....	25

The agreement among the manufacturers of Wire goods has, with some modifications, been continued. Materially lower prices are, however, prevailing, and discount 85 per cent. is mentioned as a general quotation. At figures which are obtainable by good buyers, this line of goods is regarded as a safe purchase, as the goods are not likely to go much lower, and, with the understanding which exists among the manufacturers, may perhaps be advanced in price before very long.

Heavy Hammers and Sledges are sold at low and irregular prices. Competition is animated, and the situation is not regarded by the manufacturers with especial satisfaction.

Picks and Mattocks are also offered at low prices, some of the leading manufacturers having made recent concessions.

The Daisy Wagon Jack, manufactured by the E. Covert Mfg. Company, Farmer Village, N. Y., is sold at \$4 per dozen, subject to a discount of 35 per cent.

A meeting of the manufacturers of Table Cutlery was held in this city last week, and was attended by representatives from the leading companies. The matter of prices was considered, and it was decided inadvisable to make any change at present, existing quotations being reaffirmed. The condition of things in this line is more satisfactory than it has been for some time, prices being well maintained.

Wrought-Iron Pipe is in better condition than at our last report, in which we referred to the fact that the market showed no further yielding in price, and alluded to the probability that better figures would soon prevail. The improved condition is owing largely to extensive purchases of Pipe, so that many of the mills are well occupied with orders, and show a disposition to refuse others except at advanced quotations. The activity which has characterized the market still continues. The following prices are those at present prevailing:

	Discount.
	per cent.
1 $\frac{1}{2}$ and under, plain.....	57 $\frac{1}{2}$
1 $\frac{1}{2}$ and under, galvanized.....	47 $\frac{1}{2}$
1 $\frac{1}{2}$ and over, plain.....	67 $\frac{1}{2}$
1 $\frac{1}{2}$ and over, galvanized.....	52 $\frac{1}{2}$
Boiler Tubes, Iron.....	55

Since our last reference to the Cordage market Sisal Rope has been vacillating, a decline of $\frac{1}{4}$ cent having occurred, followed, however, by an almost immediate recovery of $\frac{1}{4}$ cent, so that the price remains where it was. The market continues firm, especially in view of the marked stiffness in the price of Manila Rope.

The Screw market, notwithstanding the fact that some orders have been placed at slight concessions beyond what is regarded as the extreme price, continues decidedly firm, the agreement of the leading manufacturers working satisfactorily in the regulation of the price. While these goods are thus held firmly at a large advance beyond prices which prevailed in the days of active competition between the companies, it is to be noticed that a similar condition of things prevails abroad. Recent London advices are to the effect that the makers of Iron and Wood Screws have combined to raise their price about 60 per cent. on the net value, and to divide the field, leaving the home trade exclusively to Messrs. Nettlefold, and the German home trade to the German makers, while extra-European markets are to be supplied at 72 $\frac{1}{2}$ per cent. discount from Nettlefold's list. This is referred to as an exceptionally strong combination, which was effected with so much secrecy that speculators did not succeed in placing orders before its accomplishment, thus leaving them in a position where they cannot compete with the syndicate.

Ammunition.

Recent inquiries among the trade through the country at large develop the fact that a comparatively small proportion of the merchants pay the regular prices for Ammunition, cuts direct or indirect being exceedingly frequent. This irregularity is not confined to the houses who have openly announced cut prices, but in a quiet way extras are given by many who are compelled to adopt this course in order to meet the prices quoted by their competitors and thus hold their trade, or who make these concessions as inducements for the purchase of other goods. To such an extent does this condition of things prevail that the associated manufacturers will be obliged to take cognizance of it, or to lose such control of the market as they still retain, there being danger of an increase in this irregularity with the open announcement of cut prices by the E. C. Meacham Arms Company, Alford & Berkeley Company, McIntosh, Huntington & Co. and other houses. The association are, however, apparently reluctant to take action in the premises, as the irregularities in question are so widely practiced, and by some houses of such influence, that an attempt to enforce strict adherence to prices would be liable to precipitate a rupture which would still further embarrass them. It remains to be seen whether they will permit this state of things to continue with only mild pro-

test, which would probably be without result, or will take active measures to enforce adherence to schedule prices, and cut off the supply of any houses by whom cut prices are made. The latter course in existing circumstances is not regarded as likely to be adopted at all generally. In the meantime the houses not connected with the association are understood to be obtaining such Cartridges as they need without any special difficulty, and it is stated by some of them that since the Meacham break they have been able to procure a supply of the goods more easily than before, notwithstanding the strenuous efforts, to which we alluded in our last issue, as made by the association to prevent this. There is some disposition among "A" houses to withdraw from the association in view of the advantages they can obtain in buying and selling the goods in the open market, but as yet there has been little movement in this direction. As bearing upon this aspect of the case, we give the following extract from a letter received from a well-known Western house:

On January 1, 1888, we concluded that our interests would be better served by not buying Ammunition of the association, and the result has more than justified our judgment in the matter. We have had no difficulty in buying all the Ammunition we needed at better advantage than we could have bought of the association, and selling it at what prices we chose to make. As you are aware, the cuts are made openly and not *sub rosa* at all, and in addition to these open quotations we have numerous confidential letters naming association prices and lower. We do not think that the association amounts to a row of pins.

While there is no doubt more vitality in the association than our correspondent regards it as possessing, it is still true that the irregularity of the market and the facility with which goods are obtained indirectly, are represented in the above letter.

Items.

Wm. G. Hibbard, president of Hibbard, Spencer, Bartlett & Co., Chicago, sailed for Europe on the 7th inst. from New York. He expects to be absent for several months.

A change has been made in the membership and name of the well-known house of Ducharme, Fletcher & Co., Detroit, Mich. They are succeeded by Fletcher, Jenks & Co., J. A. Whitney having been admitted as a partner in the firm. With this exception, the persons comprising the new firm are the same as those of Ducharme, Fletcher & Co.

At their recent annual meeting we are advised that the Louis Hoffman Hardware Company, Vicksburg, Miss., declared a handsome dividend. The old officers were re-elected. The company's increasing business is referred to with the expectation that they will do a still larger business the coming year.

A considerable departure from the usual line of goods advertised in *The Iron Age* is the card of C. Ehman, manufacturer of Wood Mantels, Elizabeth and Fulton streets, Chicago, which will be found on page 49 of this issue. Mr. Ehman is a very enterprising manufacturer of Mantels, his stock comprising over 300 separate designs, of which the photographs alone have cost \$7000. As he finds his patronage is growing among dealers in Hardware he seeks through this advertisement to extend his acquaintance and increase his trade. It is not unusual in some localities to find Hardware merchants fitting up small apartments with artistic Grates, ornamental Wood Mantels, fancy Chandeliers and other pieces of furniture from their stock to show customers how nicely—and possibly how cheaply—they can fit up parlors, libraries and sit-

ting-rooms, according to the most modern ideas in household decoration.

The Chicago papers contain a great deal of news about Saturday afternoon baseball games, in which very familiar names frequently figure. One issue recently reported contests between the Horton, Gilmore, McWilliams & Co.'s nine and the W. W. Kimball & Co.'s nine; the Crane Bros. Mfg. Company's nine and the Crane Elevator Company's nine; the Wells & Nellegar nine and the Mayflowers; Markey, Alling & Co.'s nine and the Wanderers. Much interest is being taken in these contests, and the half holiday is looked forward to with eagerness by not only those who play, but their associates in their respective business houses, who take a deep interest in the result. The business of the week is dispatched with more than the usual celerity, so that the decks are kept clear for Saturday.

J. B. Field & Co., Detroit, Mich., show a large line of Sporting Goods in their pamphlet devoted to summer sports. Copious illustrations are given representing leading goods in the lines indicated. Their factory is referred to as equipped with electric power and machinery for manufacturing Split Bamboo Fishing Rods, Sporting Specialties and general Gun and Fishing Tackle repairs. The catalogue will be appreciated by those who desire information on the interesting and varied line to which it refers.

Goulds & Austin, Chicago, Ill., have issued a handsome pamphlet devoted to Well Sinking Machinery, to the exhibition of which 100 pages are given. There is thus offered to those interested in this line a very complete catalogue elegantly printed on heavy paper of superior quality and containing a large number of illustrations, many of which are new. The chapter devoted to Pole Tools is especially referred to as containing the only full line of illustrations on this subject published. These Pole Tools are used for deep drilling instead of the cable outfits used in Pennsylvania and the East. But the catalogue contains a large amount of valuable and interesting matter showing the methods and machinery used in this important industry.

The advertisement of William A. Ives & Co., on page 46 will be observed. It will be seen that they announce change of address from New Haven, Conn., to Hamden, Conn., where their factory is situated. It is also stated that their New York agency has been discontinued.

In a game of base-ball played at Communipaw, N. J., July 7, between the nine of the H. B. Newhall Company and the nine of Topping & Fox, the former were defeated by a score of 21 to 13.

Watkins, Pease & Co., of Chicago and Columbus, Ohio, have opened a branch house in Louisville, Ky., where they carry a full line of Builders' Material, such as Doors, Sash, Blinds, &c. They are said to represent two of the largest manufacturers in the Northwest.

The Hollow Cable Mfg. Company, Hornellsville, N. Y., are erecting a new two-story brick factory, 150 x 40, which they will fill with machinery for the manufacture of their goods. It is located adjacent to the tracks of the Erie Railway. The company report a large trade this season in their Hollow Cable Clothes Lines, of which they make four sizes, and in their Preston's Patent Braided Barblless Fence Wire. The demand for the latter is referred to as increasing very rapidly, and although the company have been running their works day and night for more than three months they are still behind their orders.

W. C. Smith, secretary and treasurer of the Rockford Bit Company, Rockford, Ill., having recently purchased R. H. Tinker's stock, has become sole proprietor. The company have lately bought the Ashtabula Bit Works, the two establishments being thus consolidated. Since then Mr. Smith has been considering the advisability of using natural gas, and in view of the advantages resulting from its use has decided to move the works from Rockford, Ill., and Ashtabula, Ohio, to Kokomo, Ind., where the company are now building factory, storerooms, office, &c. It is intimated that when the new works are completed the company will have a very convenient and well arranged factory. The use of natural gas is referred to as enabling them to produce goods of exceptional quality. With the increased facilities thus given they will continue the manufacture on a larger scale than heretofore of their Perfection Auger Bits, Special Wood Boring Tools, Machine Bits, &c.

The catalogue of the Westcott Chuck Company, Oneida, N. Y., illustrates Westcott's Patent Chucks, which include two styles of Drill Chucks, Little Giant Improved, of which seven sizes are made, and Oneida, of which two sizes are made, and also five styles of Lathe Chucks, as follows: Scroll Combination, ten sizes; Geared Combination, eight sizes; Plain Universal, eight sizes; Independent, seven sizes, and Cutting Off, seven sizes. The pamphlet is finely printed and fully illustrated.

The Palmer Mfg. Company, 290 Pearl street, New York, issue a convenient price list of Stove Boards, including the Pearl Embossed White Metal, paper and wood lined; Seamless Oxidized Crystal, paper and wood lined; Peerless Embossed White Metal, with figured brass border and corners, paper lined; Perfection Embossed Brass, figured corners, wood lined, and Star, paper lined, zinc polished. They also issue a separate price list of new Oxidized Zinc Stove Boards, paper and wood lined, and give an illustration showing the character of the decoration.

W. K. Morison & Co., Incorporated, who will, August 1, succeed Janney, Sample & Co., 107 Nicollet avenue, Minneapolis, Minn., in their retail Hardware business, would like to receive catalogues-discount sheets and quotations from manufacturers. Material improvements will be made in the interior arrangements of the store, and they hope to retain the large retail business which is already established there. The location is regarded as a good one, having been used as a Hardware store since 1866.

Condition of Trade.

We have the following advices in regard to the condition of business in Louisville, Ky:

The Hardware trade of Louisville, Ky., is in a healthy state, naturally quiet, as no one is making efforts to push sales. The farmers are busy attending to good crops, having no time for improvements, and consequently the country merchant has a dull time, which the jobbers feel. The salesmen are all called in, enjoying a needed rest. Building in towns goes on well—far beyond last year—while the trade in Harvesting Machinery was never so large. At last heavy rains have fallen, giving general relief, particularly to the tobacco crop, which was given up as a failure. Dealers, while still extremely conservative in buying, are careful to keep stocks full, with placed orders to draw from, firmly believing a good trade is coming soon again.

The following review of the Pittsburgh Hardware market is given by the *Dispatch*, of that city:

The year's business in Hardware closes up in the early part of July. Taking the country over, the trade shows a falling off according to the uniform testimony from all directions as compared with the previous season. Pittsburgh's trade in the line of this industry has been exceptional the past year. Interviews

with a number of the heavy operators in this line lead to the conclusion that the volume of business for 1887-8 has been up to the previous year, while the margin of profits has been reduced to a minimum. One heavy jobber says his trade has increased 25 per cent., but profits are below all former years. Another who has known the trade here almost from the beginning claims that the business will this year fall slightly below the average of the past two or three years, but says he is not disappointed, as tariff uncertainties and the excitement of the political campaign never fail to damage more or less the Hardware industry. All, however, agree that this city has suffered less from the general depression than any trade center on the continent. To hold our own after the prosperity of 1886-7 is glory enough, and few, if any, cities of the land have done this much, as Pittsburgh undoubtedly has in the line of Hardware. Investments in Nail mill plants have in the past two years been nearer zero as to value than at any period since Nails were made by machinery. The present situation of the Pittsburgh Hardware industry is in brief as follows: The volume of business for the year just closing has been equal to any previous year. Tariff uncertainties and the Presidential campaign have without a doubt brought the volume of trade for the year below what it might have been. But all in all the business has been up to the average of the past three years, and in some lines much better. Dealers generally are satisfied and hopeful. The depressed trade in Hardware through the country has affected Pittsburgh less than any other trade during the first half of 1888, and the outlook for the new season's business is as fair as the average at this time, which is called the winding up period for the year's trade and the time of planning for new ventures.

Arrangement of Stores.

We have received from A. L. Young, Sing Sing, N. Y., a description of two or three racks which are in use in his store, the

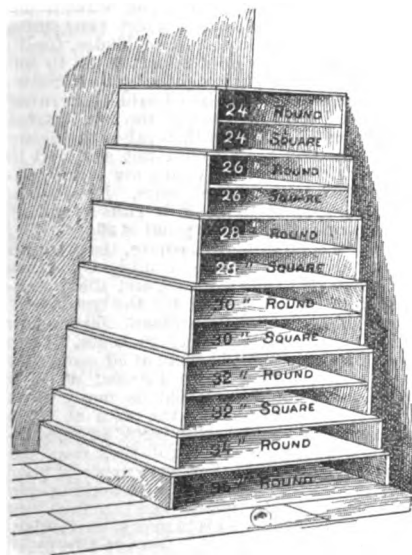


Fig. 248.—Stove-Board Rack.

first of which, a Stove Board rack, is illustrated in Fig. 248. This rack is made of $\frac{1}{4}$ -inch stuff, and is divided into compartments for holding the different sizes of Round and Square Stove Boards. These compartments are inclosed on three sides, the front being open to permit the insertion of the Boards. The Boards rest on shelves 3 inches apart, the largest being placed at the bottom, as indicated in the illustration. This rack is referred to as keeping the Boards in good shape, as they lie flat on the shelves, thus overcoming the tendency to curl up, as is the case when they stand on edge. The fact that the stock is to a great extent protected from dust is also emphasized, as well as the general utility of the arrangement.

In Fig. 249 we illustrate Mr. Young's arrangement for the accommodation of Picks, Axes, Handles, Feather Dusters, Curry Combs, &c. In this method of handling the goods large deep drawers are used in the manner indicated in the engraving. Axe boxes are utilized as drawers in the first or lower row, four

heavy iron trunk rollers being employed on each drawer to facilitate removal. Handled Axes and Picks are thus kept. The second, third and fourth rows of the arrangement above are 34 inches in length, thus leaving a ledge of 4 inches above the lower row. The drawers comprising the

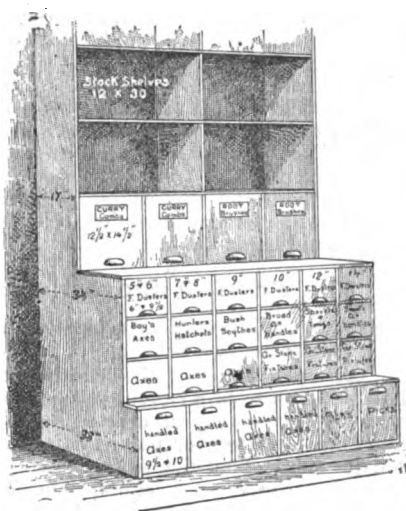


Fig. 249.—Drawers and Shelving.

first two rows are 6 x 9 $\frac{1}{4}$ inches, the others being of varying dimensions. These drawers are used for the goods indicated in the illustration, the upper row being entirely devoted to Feather Dusters. The top of this upper row corresponds with the counter level, and in the shelving there are drawers, riding on four small trunk rollers, for Curry Combs and Brushes. Wire, Finishing and Clout Nails are kept in smaller drawers, each size by itself, and large enough to hold 20 to 25 pounds each. The shelf stock is kept in conventional wooden boxes with Russell & Erwin's Sash Lifts or Pulls No. 8026—a simple open loop fastening with a screw at each end—an article which is much approved by Mr. Young for this purpose. He states that he has used over 1200 of them in refitting his store.

Fig. 250 represents his rack for Pot Covers, which is made very much on the same principle as the one described above, Fig. 248. This rack is divided by a partition down the middle, each side being 13 inches wide at the bottom and 36 inches high, and having 10 shelves each 3 inches apart. The sides of this rack are made of $\frac{1}{4}$ -inch stuff,

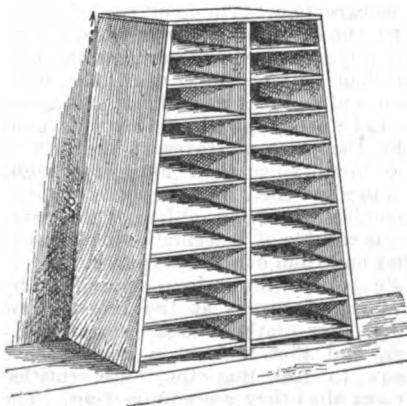


Fig. 250.—Pot-Cover Rack.

$\frac{1}{4}$ -inch material being used in the construction of its other parts. This rack accommodates the sizes of Pot Covers between 7 $\frac{1}{4}$ and 13 inches, those which measure an even number of inches being kept on one side and all others on the other side. The adaptability of this rack for the purpose for which it is intended is obvious.

R. T. Young, of Tuckahoe, N. Y., sends us a description of his method of keeping list for retailing Carriage Bolts and other goods, an illustration of which

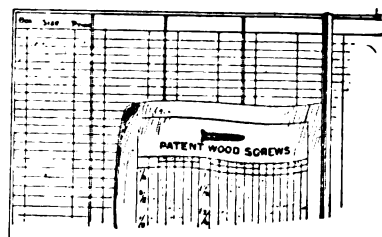


Fig. 251.—Price Card for Bolts, Screws and Hinges.

is given in Fig. 251. Two stiff paste-boards are united by a flexible leather back, the size of which is 12 x 18 inches. This is to protect from dust and dirt. The first inside page is divided into four columns for the different kinds of Bolts. This will contain prices of Bolts in sufficient variety. One of the four columns is thus arranged:

Box.	Carriage Bolts.	Price.
1	$\frac{1}{4}$ x 3.....	\$8.00
2	$\frac{1}{4}$ x 4.....	8.80
3	$\frac{1}{4}$ x 5.....	9.60
4	$\frac{1}{4}$ x 6.....	10.40

The boxes containing the Bolts are comparatively numbered and arranged consecutively, size proportioned, and divided

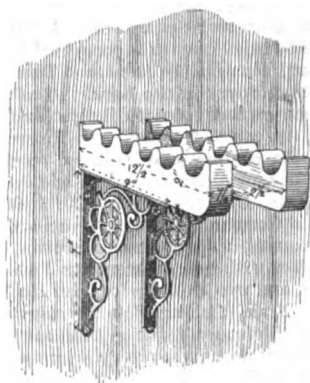


Fig. 252.—Brackets for Steel Goods.

to contain one or more packages of Bolts. The size of box, 12 x 9 x 6, is a good one, but Horse Nail boxes make a very good substitute. To avoid mixture it is suggested that in arranging the Bolts the kinds of each box should be as different as may be convenient. This method is referred to as making it as easy to find a

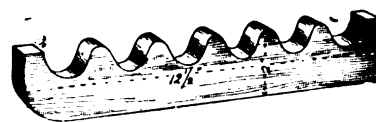


Fig. 253.—Details of Bracket for D-Handle Goods.

Bolt of any specified size as to locate an account in the ledger by the aid of an index. It is also pointed out that deficiencies of samples are readily detected. The other inside page of the price card is used for all kinds of Hinges, and between these pages is interleaved the Screw list, as shown in the illustration.

F. S. Widenor, Belvidere, N. J., sends us a description of his method of making Brackets for Shovels, Forks, Rakes, Hoes, Handled Axes, &c., which is illustrated in Fig. 252. The Brackets, which are 2 $\frac{1}{4}$ inches apart, are sawed out of $\frac{1}{4}$ -inch cherry, and are supported by 7 x 9 Rosette

Brackets, the shorter side of which is screwed to the wall. The distance between Brackets is ample to admit handles. By this method a large stock of the goods is satisfactorily accommodated. Mr. Widenor alludes to the convenience and efficiency of this arrangement, and states that the cost of these Brackets complete does not exceed \$3 per dozen pairs.

The details of Bracket for D-Handle Forks and Shovels are shown in Fig. 252. For accommodating long handle goods the Brackets are made with eight places instead of six, as shown.

Referring to another feature of his arrangement Mr. Widenor writes:

I find the use in my store of Spool Cases or Cabinets to be very advantageous. They can be bought of any dry goods house for from 50 cents to \$2 each, according to the number of drawers in them. I have in use 12 of these cases, and find that with a little alteration of the partitions they are very convenient. I use one case with two drawers, one for narrow Wrought Butts and another for Brass Butts. When I have a customer for any of these goods I pull out the drawer, and he sees at a glance the different sizes, and I am thus saved the trouble of taking down eight or ten small broken boxes and replacing them after the customer has purchased. Another cabinet of two drawers I use for Bright Auger Bits. One of four drawers is devoted to Black Auger Bits, Twist Drills, &c.: Black Auger Bits, two drawers; Morse Twist Drills, one drawer, while the other drawer is occupied by Nail Sets, Reamers, Punches, Countersinks, &c. Another cabinet of three drawers is used as follows: One drawer, Keys, all kinds, each in a separate place; one drawer, Screw Eyes in the front part and Springs and Rivets in the back. The third drawer is occupied by Copper Rivets and Burrs in the front, and Tinned Iron Rivets and Burrs in the back. A cabinet of four drawers is devoted to Bright and Black Augers, to each of which two drawers are given. Plane Bits and Gouges, each one drawer, occupy another cabinet, and Jennings' Auger Bits, Syracuse Twist Drill Bits for wood and German Gimlet Bits are accommodated in another three-drawer cabinet. I use one cabinet with two drawers for Fish Hooks in boxes, and two cabinets for Fish Hooks tied to gut. Brass Fishing Pole Ferrules occupy another. Before adopting this method of arrangement I found it very inconvenient to show the goods mentioned, but now the whole stock is readily placed before the customer. Another advantage is that in ordering any of these goods you can see at a glance just what you have in stock, and by marking numbers, &c., on the partition, you know just what to order.

Show Window Decoration.

A correspondent, writing from Boston in regard to this matter, says: "It is a good plan to advertise one's business in the papers, but for all of that the windows should be so arranged that the customer will find the store without asking half a dozen people where it is. A little study and some originality will accomplish wonders. For instance, fill the window with stove-pipe, and hang on a card with this notice:

"YOU DO NOT HAVE FITS WHEN
YOU PUT OUR STOVE-PIPE TO-
GETHER, AS IT'S THE PIPE THAT
HAS THE 'FITS.'"

There would be little use in having the card and pipe in the window for a decade—a week would be long enough. If the boys in the shop have some spare time, a collection of tin cups could be made, from as small as the tinner can make to one of Jumbo size. These cups being arranged in their proper order, will be sure to attract attention. A small cook stove could be put in the window, and everything arranged as though the window was a kitchen. If the figure of a woman could be secured, and this supposed person be

made to appear to be engaged in cooking, there would surely be a crowd in front of the store for days together.

After the tin cups have ceased to be a novelty, some other article of tinware could be selected for similar display. Almost every tin shop has wash boilers from 7 to 10 inches. By making two or three smaller sizes of boilers, and putting the collection in the show window, the desired effect will be certain to be produced using this article. The large dry goods stores have men called window dressers, whose business it is to arrange the show windows, and the passer-by each day observes a new display. Not only that, but the windows are often kept lighted after the store is closed, so those who pass can see what is to be shown. Similar ideas will pay in the stove and hardware line.

The Price of Stoves.

Relating to this matter a recent issue of *The Metal Worker* says:

A correspondent in the Southwest, whom we know to be a careful and regular reader of this paper, in a letter to the Editor not intended for publication, asks some questions about the selling price of stoves that would seem appropriate for discussion in this column. We think we violate no confidence in explaining why we allude to the subject at this time, nor yet in referring directly to portions of his letter. What he asks is perhaps in the minds of other dealers, and portions of what we have said to him in the reply we have sent may therefore be of benefit in various directions. Without quoting the letter we may say that our correspondent has in mind that stove castings can be made at present for about 3 cents per pound, while stove manufacturers want from 6 to 7 cents per pound for the goods they have to sell. He argues that with a cast so low and a price so high, relatively, something must be wrong, but rather than charge the manufacturers with an unreasonable profit in a way to do them injustice he comes first to us to ask a little information.

The reason that stoves are not sold as low as our correspondent thinks would be proper, in view of the cost figures he has secured, is primarily because his cost figures are erroneous. The cost of stoves at the present time is not the same as the cost of castings, but a much higher figure. The castings are only one of several items entering into the finished stove. Before the castings are made there is the heavy item of design and patterns, and as a part of the cost of almost every modern stove is a royalty on one or more improvements in construction. The foundry cost alone, which the figure quoted represents, is estimated by some well-informed persons to be less than half of the cost of the stove when sold and ready to ship. Assuming this to be even approximately true it would make the price of stoves at the present time low, rather than much too high. This in a nut-shell is the reply to our correspondent's inquiry, although the same idea is capable of presentation in different forms and from other standpoints.

We believe the prices demanded by stove manufacturers at the present time to be low rather than unreasonably high, and that makers in general have reason to feel that they are entitled to more than they are now getting. The efforts that are being made by stove manufacturers to secure better prices through the medium of agreements, &c., are based not upon inordinate greed, but rather upon a reasonable desire to get a fair price for certain goods which competition has put at figures too low to be remunerative. These general remarks are perhaps not called for by anything in the letter above referred to, but as they express the truth as we see it we offer them

for the consideration of our readers. When conditions change and prices are fixed at a figure unreasonably high we shall have something to say on the other side.

Uniformity in Marking Goods.

The following letter from a correspondent in Brooklyn has been called out by the article which appeared under the above title in the last issue of *The Iron Age*. The writer treats the subject from a little different standpoint than the correspondent whose letter has already appeared, and presents a record of experience which will be found of interest to many in the trade. He says:

To the Editor: I notice the article entitled "Uniformity in Marking Goods," signed by "Veteran." The idea of the correspondent is, in my opinion, a good one, and is the proper way to mark regular goods, but it will not work in all cases. There are at present a great many goods sold at auction, and I frequently make purchases on such occasions. From the number of people present, and the quantity of goods sold, I am satisfied that the auction is not held especially for my benefit. From long experience in business I have learned that it is possible to charge too little as well as too much for goods. To illustrate, suppose I go to the auction and purchase a few gross, more or less, of all-bristle scrub brushes at 7 cents each. These are worth in a regular way \$3 a dozen. I put them in a basket at the door and mark them, "All-bristle scrubs, only 10 cents; worth 35 cents." At that figure there would be a fair profit; but I might just as well put out gold dollars and mark them 25 cents each. People look at them, put them down with a wise look on their face, as much as to say, "you can't fool me," and pass on. Now, my plan to sell the goods above mentioned is to mark them 25 cents. The man down the street charges 35 cents for his; you cut his prices, and that is all you want to do. I purchased some shears a short time since, with 8 inch straight cutter steel blades, for 10 cents each. It was impossible for me to sell them until I had put the price up to 40 cents; then people believed what I said concerning them, and I soon disposed of the lot. I tried them first at 15 cents and then raised the figure to 25 cents, but they would not sell. At 15 cents people seemed to doubt my word concerning the quality of the shears. I believe in selling cheap, and make it a rule to sell all regular goods at a uniform profit of 25 per cent., except it be something like stoves, that require a great deal of extra time and trouble. Upon that class of goods I get all I can, and then, occasionally, am not half paid for the trouble. I purchased some time ago about 250 odorless cooking pots, 7 and 8 inch, at 16 cents. I put a cover on them and sold them at 50 cents and 75 cents each. They were disposed of very rapidly, and I could have sold as many more if I had them. If I had put the price at a less figure, which I could easily have afforded to do, people would have thought they were too cheap to be good, that they were made of poor iron, would black the food, or something else was the matter with them, when the fact was they were first-class goods in every particular.

SHARP BUYER.

The letter of our correspondent is interesting and instructive as throwing some light upon the methods at present in vogue in the retail trade in some sections of the country. No doubt there are those who follow a different plan from that outlined, a description of which would add to the general discussion of an interesting subject, and from them we invite an expression of opinion.

Speed of Electricity.—According to Professor Gould's investigations on the speed of electricity, it appears that aerial telegraph wires on poles transmit electricity at the rate of from 14,000 to 16,000 miles per second, and that the velocity of the transmission increases with the distance between the wires and the earth—or, in other words, with the height of suspension; and that the subterranean wires, like submarine cables, transmit with reduced rapidity. Again, while wires suspended at a feeble height are known to transmit signals at a velocity of some 12,000 miles per second; those that are suspended higher give a velocity of 16,000 to 24,000 miles.

The Peerless Register.

By means of the accompanying illustrations we show a combined register border and box which is being offered to the trade by Messrs. Tallmage Bros., of 80 and 82 Seneca street, Buffalo, N. Y. Fig. 1 of the engravings represents a floor register, while Fig. 2 is an illustration of a register intended for use in the wall of a room. The floor register consists of

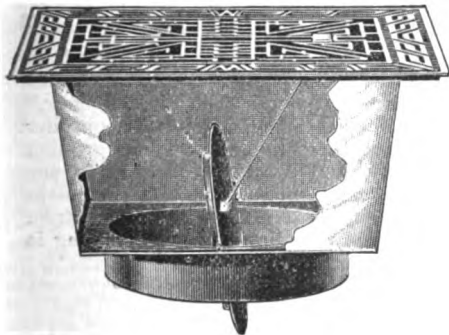


Fig. 1.—The Peerless Floor Register.

a face and border in one plate, together with a box, the sides of which are made of tin. The sides connect with a cast-iron plate, which forms the bottom of the box, on which is a collar for the purpose of connection with the hot-air pipe leading from the furnace. In place of the fans or wings ordinarily employed for shutting off the heat a damper is placed in the collar at the bottom of the box and connected by an arm with a slide in the register face. This permits the damper to be easily operated, and retains it in the position in which it may be placed. The tin box is made of IX bright tin in four pieces. The device is so made as to be readily taken apart and packed in small space for shipment without liability of breakage. The damper above referred to is located about 7 inches below the floor, and is so disposed as to reduce the liability to fire from an overheated register to a minimum. The entire register is held by two bolts, and can be readily put together. The side wall register, shown in Fig. 2 of the illustrations, is one of the same general design as the floor register just described. Its construction is such as to admit of its

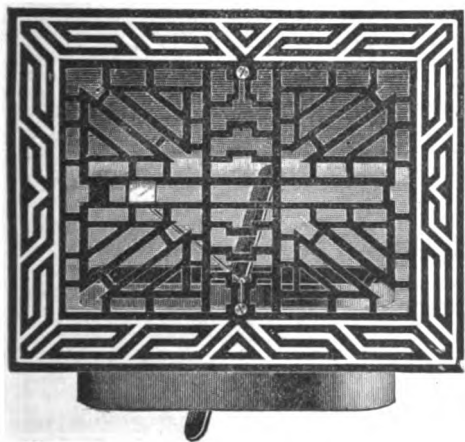


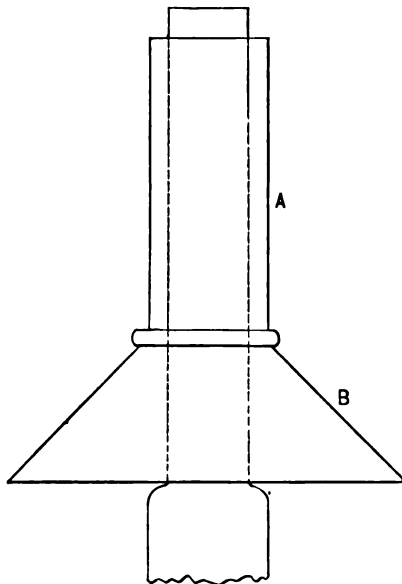
Fig. 2.—View of Side Wall Register.

being used in partitions made from 3-inch studding and upward without obstruction to the free passage of air. In this register the cast-iron plate forming the bottom of the box is turned at right angles to the face. The collar in this instance is made oval to fit the standard sizes of oval pipe. The operation of the damper in this register is the same as in the one already de-

scribed. The company state that this register can be advantageously employed on the second floor, as the oval pipe can be continued to the register, thus giving an opportunity to start from the wall pipe at the lowest point possible and connect with the register close up to the floor, thereby allowing an elevation between the air-pipe and register of the full width of the joist. The opening in the face of the register is fully one-sixth more than the capacity of the collar, thus allowing of a free circulation of air. The company make a departure in listing their registers, and indicate their various sizes by numbers, which number represents the size of the collar. These registers are made under the personal supervision of the inventor, H. K. Tallmage, and are fully covered by letters patent.

Sheet-Metal Lamp Shade.

A correspondent gives the following description of a sheet-metal lamp shade: For a number of years the writer has used a kerosene lamp and during the time has tried various kinds of shade. With every shade tried one difficulty was experienced, and that was that the heat from the chimney made the head hot, and what heat came from the chimney was apt to strike the eyes or cause double shadows. When drawing is to be done by lamp light one set of



Sheet-Metal Lamp Shade.

shadows is enough. The shade shown in the accompanying sketch can be made of light-gauge galvanized iron, and, if colored blue inside, will be so much the better. The upright part A can be made such size as the lamp chimney may require, the object being to extend the tube about to the top of the chimney of the lamp. The reflector B can be made as indicated in the drawing. Those who are accustomed to working by lamp light and have used the ordinary shades that are to be purchased at the stores have no idea how their eyes will appreciate a lamp shade that will throw the light just where it is required and no where else. While the drawing illustrates a shade adapted to a student's lamp, the shape of shade can be made to suit any kind of lamp.

An account given by the *Railroad Gazette* of the successful use of a device for scraping sand off the rails behind the locomotive, states "that 20 cars could be drawn up a given grade when the device was in use, and only 18 when the sand was al-

lowed as usual to lie on the rails. This may be taken as proving that the presence of crushed sand on the rail increases the resistance of the train, and that this sand can be removed by the use of a sweeper. Experience alone can show whether the steel brushes used will be durable."

Clewell's Patent Ice-Cream Dish and Measure.

At various times in the past, we have received inquiries from correspondents relative to devices designed to assist the

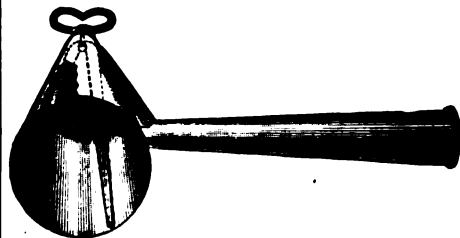


Fig. 1.—The Clewell Ice-Cream Dish.

confectioner in advantageously dispensing ice-cream. By means of the accompanying illustrations, we present for the consideration of our readers two views of articles designed to meet the requirements of the retail ice-cream trade, manufactured by Valentine Clad, of Philadelphia, Pa. Fig. 1 of the illustrations shows a perspective view of what is known as the Clewell patent ice-cream dish, the construction of which is clearly indicated in the engraving. It is made with two revolving knives which cut the cream loose, allowing it to slip out without loss of time. At the bottom of the dish will be noticed a button, the object of which is to revolve the knives. The manufacturer states that the device works equally well with soft or hard cream, with mixed or plain cream, and that it takes less time to serve the cream than with a spoon. It is made extra strong and in five standard sizes, holding regulated amounts to the quart.



Fig. 2.—The Clewell Ice-Cream Measure.

In Fig. 2 of the engravings is shown an ice-cream measure, constructed upon the same general principle as the article just described. The engraving presented herewith shows a side of the measure broken away, revealing both the button and the revolving knives. The manufacturer states that by the use of these articles, the confectioner can rapidly measure his cream and remove it from the vessel, and that they are well calculated to prevent the loss of patience, especially when the store is crowded with customers all anxious to be served. It is stated that by the use of the ice-cream measure here shown, orders can be filled in one-quarter the time occupied when the old-fashioned ice-cream measure employed.

Perfect Postal Packages.

The Postal Package Company, Baltimore, Md., are manufacturing a package for mailing liquids, oils, syrups and such similar goods, which is designated as above and represented in the illustration given herewith. It consists of a tin box lined



The Perfect Postal Package.

with a wooden tube to prevent the tin from being crushed by the weight of mail matter and to protect the glass from breakage. The wooden tubes are lined with heavy absorbent material, which, should breakage of the glass occur, will absorb the liquid and prevent damage to extraneous objects. This form is put upon the market as an improvement upon that previously made by the company, a square block with tin inside, and is called their Improved 1888 Perfect Postal Package. It is alluded to as stronger, lighter, cheaper and more compact. The packages have, it will be observed, a screw top, permitting them to be easily opened and closed. The tin case is referred to as absolutely oil and water proof. A large variety of patterns and sizes are announced, and other similar cans made by the company. In their circular they give the following extract from regulations of the Universal Postal Union, which indicate the requirements of the Post Office in regard to mailing liquids, &c.: "Samples of liquids, fatty substances and powders, whether coloring or not (except such as are dangerous, inflammable, explosive or exhale a bad odor) are admitted to the mails exchanged between the United States and those foreign countries which admit such samples to the mails they exchange with other countries of the Universal Postal Union, provided said samples conform to the following conditions—viz.: They must be placed in thick glass bottles, hermetically sealed; the bottles must be placed in a wooden box containing sufficient spongy matter to absorb the contents if bottle should break. The whole to be inclosed in an outside metal case bearing the address. The wooden box and outside case must be closed so they may be easily opened for examination of the contents. The whole package must not exceed in weight 8½ ounces, nor in size 8 x 4 x 2 inches, except those addressed to the Argentine Republic, Belgium, France or Switzerland, which may weigh not to exceed 12 ounces, and measure not to exceed 12 x 8 x 4 inches."

The Kentucky Rock Gas Company, of Louisville, Ky., J. H. Lindberger, president, Major W. J. Davis, manager, are making arrangements to pipe gas to Louisville from their wells in Meade County, situated about 80 miles below the city, on the Ohio River. The fields in which they are boring promise an abundant supply for all requirements of Louisville. They have

no "gushers," but from the wells already sunk there is a steady flow and some have been bored long enough to prove their lasting qualities. There are several companies drilling in Meade County, all of which have been successful in finding gas and the Kentucky Rock Gas Company have completed arrangements to lay the pipe line and purchase the outflow of the other wells, which will be added to their product and carried to the city. They have now, collectively, between 13,000,000 and 14,000,000 cubic feet of gas per day, by actual measurement. This of itself is a good source of revenue, but they expect soon to produce 40,000,000 to 60,000,000 of feet per day and will lay the mains accordingly. The company contemplate being ready to furnish gas to consumers by October.

Clad's Patent Ice-Cream Machine.

This machine is manufactured by Valentine Clad, 117 and 119 South Eleventh street, Philadelphia, Pa. It is shown in the accompanying illustration. This machine is described as possessing features entirely new, and as designed to make a smoother ice-cream than can be made by other machines, and requiring less time and power, and giving a saving of ice and salt over other processes. This machine is made of iron with 44-inch fly-wheel, cedar tub, flat bottom, iron rim, open tin can fitted with adjustable scrapers of special design and with a steel blade, wood handle paddle so arranged as to give a motion the same as beating by hand. In regard to

by the scrapers forcing it to the center, it is taken up by the paddle on a constant and continuous upward movement, and on reaching the top, by the motion is compelled to descend to the sides of can, smoothing every particle in its passage, and preventing stagnation in the center and warmest part of the can, at the same time allowing an expression of air through the cream mixture, by which a lightness exceeding the most skillful paddling is accomplished, at the same time freeing the cream from all obnoxious matters by means of a complete aeration when freezing, it being a well-known fact that cream, however pure is subject to certain fermentations. As the cream thickens on the final beating the paddle is run faster by simple adjustment of the fast gear." The can being open enables the operator to see whether the freezing is progressing properly, and to test the cream at any stage of the process. Its service also in allowing the escape of vapor arising from the cream in the first stages of freezing is also referred to.

Lighting With Magnesium.—According to *Engineering*, there has recently been installed in a brewery at Marbourg a system of lighting with magnesium which is stated to give very satisfactory results. The lamps have been constructed by M. Juss, of Marbourg, and have an intensity of 450 candles, the light being covered with a globe of depolished glass. The light is white in color, very steady, and a single lamp suffices for the lighting of a



Clad's Patent Ice-Cream Machine.

the operation of the machine the manufacturer says: "The process of making cream by our machine is identically the same as making by hand, the cream frozen first and beaten up afterward, the can being rotated in the early and last stages of freezing; the motion of the paddle being suspended, this keeps the cream well cut down and does not froth or churn it. In first beating, by the adjustment of the slow motion of paddle and removing of the frozen cream from the sides of the can

room of 50 feet by 33 feet, in which work of a very delicate nature is not to be performed. A single lamp placed at the front of the building and furnished with a reflector lights up the road for a considerable distance, and completely eclipses neighboring gaslights. The light is, however, much too strong to be employed unshaded for lighting public streets. The price of the lamps is said to be about \$38, and the cost of maintenance about 25 cents per hour.

Eagle, 4½-in. Rod. 2.85, dis 35
 Crown, 4-in., 35.50; 6-in., 44.00; 7-in., 51.50 each, dis 25
 Crow's Jewel, 4-in., 35.50; 6-in., 44.00; 7-in., 51.50 each, dis 25
 American, 5-in., 35; 6-in., 35.40; 7-in., 44.50 each, dis 35
 Domestic Fluter. \$1.50 each, net
 Geneva Hand Fluter, White Metal. 75c \$13, dis 25
 Crown Hand Fluter, No. 1, 51.5; 2, 51.50; 3, 51.0; dis 30
 Shepard Hand Fluter, No. 85. 75c \$15.50, dis 40
 Shepard Hand Fluter, No. 110. 75c \$11, dis 40
 Shepard Hand Fluter, No. 95. 75c \$9, dis 40
 Clark's Hand Fluter. 75c \$15.00, dis 35
 Combined Fluter and Sled Iron. 75c \$15.00, dis 30
 Buffalo. 75c \$10.00, dis 10
 Fluting Scissors. dis 45
 Fly Traps. 75c \$1.50 @ 1.75
 Paragon. 75c \$1.50 @ 1.75
 Hay, Manure, &c., Asso. list. dis 60.25
 Hay, Manure, &c., Phila. list. dis 60 @ 60.25
 Plated, see Spoona.
 Freezers, Ice Cream.
 Buffalo Champion. dis 60.25
 Shepard's Lightning. dis 60
 White Mountain. dis 60
Fruit and Jelly Presses.
 Reckprize Mfrs. Co. dis 30.10 @ 30
 Henk. 75c \$4.50
 P. D. & Co. 75c \$4.50
 Shepard's Queen City. dis 40
Fry Pans.
 High List. dis 75.25 @ 75.10.25
 No. 0 1 2 3 4 5 6 7 8 9
 75c \$3.75 4.70 5.50 6.55 7.50 8.75 10.00 11.25
 Low List. dis 70.10
 No. 0 1 2 3 4 5 6 7 8 9
 75c \$3.00 3.75 4.25 4.75 5.25 6.00 7.00 8.00 9.00
Fuse.
 Common Hemp Fuse, for dry ground. \$2.70
 Common Cotton Fuse, for dry ground. 2.55
 Single Taped Fuse, for wet ground. 6.00
 Double Taped Fuse, for very wet ground. 6.00
 Triple Taped Fuse, for very wet ground. 7.25
 Small Gutta Percha Fuse, for water. 7.50
 Large Gutta Percha Fuse, for water. 12.00
Gauges.
 Marking Mortise, to dis 60.10
 Wire, low list. dis 10.10
 Wire, Wheeler, Madden & Co. dis 10
 Wire, Morse's. dis 60 @ 60.25
 Wire, Brown & Sharpe's. dis 60 @ 60.25
 Wire, Le. Wall and Spike dis 50.10.25
 "Eureka" Glimlets. dis 40.10
 "Diamond" Glimlets. 75c gross \$3.00
 Double Cut, Shephardson's. dis 45 @ 45.25
 Double Cut, Ives'. dis 60 @ 60.25
 Double Cut, Douglass'. dis 40.10
 "Bee". 75c gross \$12, dis 55 @ 55.25
 Le. Page's Liquid. dis 25 @ 25.25
 Upton's Liquid. dis 35
 Fine Fats.
 Tinned and Enameled. 75c @ 40.25 @ 40.10
 Family, Howe's "Eureka". dis 40
 Family, L. F. & C.'s "Handy". dis 50
Grindstones.
 Small, at factory. 75c ton \$7.50 @ 9.00
Sargent's Patent.
 Reading Hardware Co. dis 30.10
Hack Saws.—See Saw.
 Halters.—Covett's, Rope, 4-in. Jute. dis 50.25
 Covett's, Rope, 4-in. Hemp. dis 40.25
 Covett's Adj. Rope Halters. dis 40.25
 Covett's Hemp Horse and Cattle Tie. dis 50.25
 Covett's Jute Horse and Cattle Ties. dis 60.10.25
Hammers.
 Handled Hammers. List Dec. 1, 1885, dis 35 @ 50.10
 Buffalo Hammer Co. List Jan. 15, '87
 C. Hammond & Son. dis 50 @ 50.25
 Humason & Beckley. dis 50
 Atha Tool Co. dis 50
 Fayette R. Plumb. dis 40.10 @ 50
 Verree. dis 50
 Magnetic Hammer, No. 1, 4.50, 2, 4.50, 3, 4.50, 4, 4.50, 5, 4.50, 6, 4.50, 7, 4.50, 8, 4.50, 9, 4.50, 10, 4.50, 11, 4.50, 12, 4.50, 13, 4.50, 14, 4.50, 15, 4.50, 16, 4.50, 17, 4.50, 18, 4.50, 19, 4.50, 20, 4.50, 21, 4.50, 22, 4.50, 23, 4.50, 24, 4.50, 25, 4.50, 26, 4.50, 27, 4.50, 28, 4.50, 29, 4.50, 30, 4.50, 31, 4.50, 32, 4.50, 33, 4.50, 34, 4.50, 35, 4.50, 36, 4.50, 37, 4.50, 38, 4.50, 39, 4.50, 40, 4.50, 41, 4.50, 42, 4.50, 43, 4.50, 44, 4.50, 45, 4.50, 46, 4.50, 47, 4.50, 48, 4.50, 49, 4.50, 50, 4.50, 51, 4.50, 52, 4.50, 53, 4.50, 54, 4.50, 55, 4.50, 56, 4.50, 57, 4.50, 58, 4.50, 59, 4.50, 60, 4.50, 61, 4.50, 62, 4.50, 63, 4.50, 64, 4.50, 65, 4.50, 66, 4.50, 67, 4.50, 68, 4.50, 69, 4.50, 70, 4.50, 71, 4.50, 72, 4.50, 73, 4.50, 74, 4.50, 75, 4.50, 76, 4.50, 77, 4.50, 78, 4.50, 79, 4.50, 80, 4.50, 81, 4.50, 82, 4.50, 83, 4.50, 84, 4.50, 85, 4.50, 86, 4.50, 87, 4.50, 88, 4.50, 89, 4.50, 90, 4.50, 91, 4.50, 92, 4.50, 93, 4.50, 94, 4.50, 95, 4.50, 96, 4.50, 97, 4.50, 98, 4.50, 99, 4.50, 100, 4.50, 101, 4.50, 102, 4.50, 103, 4.50, 104, 4.50, 105, 4.50, 106, 4.50, 107, 4.50, 108, 4.50, 109, 4.50, 110, 4.50, 111, 4.50, 112, 4.50, 113, 4.50, 114, 4.50, 115, 4.50, 116, 4.50, 117, 4.50, 118, 4.50, 119, 4.50, 120, 4.50, 121, 4.50, 122, 4.50, 123, 4.50, 124, 4.50, 125, 4.50, 126, 4.50, 127, 4.50, 128, 4.50, 129, 4.50, 130, 4.50, 131, 4.50, 132, 4.50, 133, 4.50, 134, 4.50, 135, 4.50, 136, 4.50, 137, 4.50, 138, 4.50, 139, 4.50, 140, 4.50, 141, 4.50, 142, 4.50, 143, 4.50, 144, 4.50, 145, 4.50, 146, 4.50, 147, 4.50, 148, 4.50, 149, 4.50, 150, 4.50, 151, 4.50, 152, 4.50, 153, 4.50, 154, 4.50, 155, 4.50, 156, 4.50, 157, 4.50, 158, 4.50, 159, 4.50, 160, 4.50, 161, 4.50, 162, 4.50, 163, 4.50, 164, 4.50, 165, 4.50, 166, 4.50, 167, 4.50, 168, 4.50, 169, 4.50, 170, 4.50, 171, 4.50, 172, 4.50, 173, 4.50, 174, 4.50, 175, 4.50, 176, 4.50, 177, 4.50, 178, 4.50, 179, 4.50, 180, 4.50, 181, 4.50, 182, 4.50, 183, 4.50, 184, 4.50, 185, 4.50, 186, 4.50, 187, 4.50, 188, 4.50, 189, 4.50, 190, 4.50, 191, 4.50, 192, 4.50, 193, 4.50, 194, 4.50, 195, 4.50, 196, 4.50, 197, 4.50, 198, 4.50, 199, 4.50, 200, 4.50, 201, 4.50, 202, 4.50, 203, 4.50, 2

Best Anti-Friction.....	dis 60
Duplex (Wood Track).....	dis 60
Terry's Patent.....	dis 60
His.....	dis 60
Cronk's Patent..... No. 4, 518; No. 5, 514.40; No. 6, 515	dis 60
Wood Track Iron Clad.....	dis 60
Carrier Steel Anti-Friction.....	dis 60
Architect.....	dis 60
Eclipse.....	dis 60
Felix.....	dis 60
Richards.....	dis 60
Lane's Steel Anti-Friction.....	dis 60
The Ball Bearing Door Hanger.....	dis 60
Warner's Patent.....	dis 60
Stearns' Anti-Friction.....	dis 60
Stearns' Chaise.....	dis 60
Faultless.....	dis 60
American.....	dis 60
Rider & Wooster, No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000	

Harnesse Snaps.—See Snaps.

Hatchets.—List Jan. 1, 1886.

Isiah Blood.....	dis 25	40 1/2
Hunt's Shingling Lath and Claw.....	dis 40 1/2	50
Hunt's Broad.....	dis 40	50
Buffalo Hammer Co.....	dis 40 1/2	50
Burd's.....	dis 40 1/2	50
Fayette R. Plumb.....	dis 40 1/2	50
Wm. Mann, Jr., & Co.....	dis 50	50 1/2
Underhill Edge Tool Co.....	dis 40 1/2	50 1/2
Underhill's Haines and Bright goods.....	dis 33 1/2	40
C. Hammond & Son.....	dis 40 1/2	50
Simmons.....	dis 40 1/2	50
Peck's.....	dis 40 1/2	50 1/2
Kelly's.....	dis 50	50 1/2
Sargent & Co.....	dis 50	50
Tom Ryck Edge Tool Co.....	dis 40 1/2	50 1/2
Collins, following list.....	dis 40	50
Shingling, Nos. 123.....	dos 25	50 50 50
Claw, Nos. 123.....	dos 6 00	6 00 7 00
Lathing Nos. 123.....	dos 6 00	6 00 6 50

Hay Knives.

Lighting.....	dis 25
Electric.....	dis 25
Gem.....	dis 25
Wadsworth's.....	dis 25
Carter's Needle.....	dis 25
Heath's.....	dis 25

Hinges.

Wrought Iron Hinges—	
Strap and T.....	dis 70
Screw Hook and Eye.....	dis 70
Strap.....	dis 70
Heavy Welded Hook.....	dis 70
Screw Hook and Eye.....	dis 70
Roller Hinged Hinges, Nos. 22 and 24.....	dis 70
Roller Hinged Hinges, Nos. 26 and 28.....	dis 70
Roller Hinged Hinges, Nos. 30 and 32.....	dis 70
Roller Hinged Hinges, Nos. 34 and 36.....	dis 70
Roller Hinged Hinges, Nos. 38 and 40.....	dis 70
Roller Hinged Hinges, Nos. 42 and 44.....	dis 70
Roller Hinged Hinges, Nos. 46 and 48.....	dis 70
Roller Hinged Hinges, Nos. 50 and 52.....	dis 70
Roller Hinged Hinges, Nos. 54 and 56.....	dis 70
Roller Hinged Hinges, Nos. 58 and 60.....	dis 70
Roller Hinged Hinges, Nos. 62 and 64.....	dis 70
Roller Hinged Hinges, Nos. 66 and 68.....	dis 70
Roller Hinged Hinges, Nos. 70 and 72.....	dis 70
Roller Hinged Hinges, Nos. 74 and 76.....	dis 70
Roller Hinged Hinges, Nos. 78 and 80.....	dis 70
Roller Hinged Hinges, Nos. 82 and 84.....	dis 70
Roller Hinged Hinges, Nos. 86 and 88.....	dis 70
Roller Hinged Hinges, Nos. 90 and 92.....	dis 70
Roller Hinged Hinges, Nos. 94 and 96.....	dis 70
Roller Hinged Hinges, Nos. 98 and 100.....	dis 70
Spring Hinges—	
Gem's Spring and Blank Butts.....	dis 40
Union Spring Hinge Co.'s list, March, 1886.....	dis 40
Acme and U. S.....	dis 40
Empire and Crown.....	dis 40
Hero and Monarch.....	dis 40
American, Gem, and Star, Branded.....	dis 40
American, Gem, and Star, Branded.....	dis 40
Oxford, Bronze and Brass.....	dis 40
Barker's Double Acting.....	dis 40
Union Mfg. Co.....	dis 40

Pennsylvania.....dis 40x10x
Nos. 1 2 3 4 5 6 7 8 9 10
Miles' Challenge, Nos. 1 2
Home No. 1.....dis 45x10x
Draw Cut, Nos. 1 2 3 4 5 6 7 8 9 10
Best Shaver, Enterprise Mfg. Co., dis 20x25x
Chadborn's Smoked Beef Cutter.....dis 20x25x

Mining Knives.
Am. Std quality, 7 gro, 1 blade, 77; 3 blades, \$18; 3 blades, \$18.
Lothrop's.....dis 20x10x
Smith's, 7 gro, Single, \$5.00; Double, \$8.00; dis 20x10x
Knapp & Cowles.....dis 50x10x
Buffalo Adjustable.....dis 20x25x

Melanes Gates.—Stebbins' Pat., dis 70x70x74x
Stebbins' Tinned Ends.....dis 40x10x
Chase's Hard Metal.....dis 20x10x
Bush's.....dis 20x10x
Lincoln's Pattern.....dis 20x10x
Wood's.....dis 20x10x
Dose Nos. 1 2 3 4 5 6 7 8 9 10
\$7.00 8.00 9.00 10.00, dis 20x10x10x

Money Drawers.—7 gro, \$18 @ \$20.
Mussies.—Safety, 7 gro, \$3.00, dis 25x

Nails.—See Trade Report
Wire Nails, Standard Penny.....dis 20x10x
Wall Puller.—Curtis Hammer.....dis 20x10x
Pelican.....dis 20x10x
Round.....dis 20x10x
Nail Sets.—Square.....dis 20x10x
Cannon's Diamond Point.....dis 20x10x

Hot Crackers.
Table (Hudson & Beckley Mfg. Co.).....dis 40x
Blake's pattern.....dis 20x10x
Turner & Seymour Mfg. Co.....dis 50x

Nuts.
Nuts, all kinds, 5¢ off list Jan. 1, 1898.
In lots less than 100 lb., 7¢, add 1¢, 1 lb boxes add 1¢
to list.

O. Ham.
Government.....dis 20x10x
U. S. Navy.....dis 20x10x
Havy.....dis 20x10x
Oilers.—Zinc and Tin.....dis 20x10x
Bess and Copper.....dis 20x10x
Walleable, Hammers' Improved, No. 1, \$3.00; No. 2,
\$4.00; No. 3, \$4.40, dis 10x10x10x
Walleable, Hammers, Old Pattern, same list.....dis 40x
Prior's Patent or "Paragon" Zinc.....dis 20x10x10x
Prior's Patent or "Paragon" Brass.....dis 20x10x10x
Olmstead's Tin and Zinc.....dis 20x10x10x
Olmstead's Brass and Copper.....dis 20x10x10x
Broughton's Zinc.....dis 20x10x10x
Broughton's Brass.....dis 20x10x10x

Packing, Steam.
Rubber.....dis 20x10x
Standard.....dis 20x10x
Extra.....dis 20x10x
N. Y. B. & P. Co., Standard.....dis 20x10x
N. Y. B. & P. Co., Empire.....dis 20x10x
N. Y. B. & P. Co., Salamander.....dis 20x10x
Jenkins' Standard.....dis 20x10x

Miscellaneous.
American Packing.....dis 20x10x
Russia Packing.....dis 20x10x
Italian Packing.....dis 20x10x
Cotton Packing.....dis 20x10x
Jute.....dis 20x10x
Padlocks.—See Locks.

Pails.
Sealed Iron—
Quarts.....dis 20x10x
Bill's Light Weight, 7 gro, \$2.75; 3 gro, \$2.25
Bill's Heavy Weight, 7 gro, \$3.00; 3 gro, \$2.75
Whiting's.....dis 20x10x
Sidney Shepard & Co.....dis 20x10x
Iron Clad.....dis 20x10x
Fire Buckets.....dis 20x10x
Buckets, see Wall Buckets

Industrious Fibre Ware—
Star Pails, 12 qt.....dis 20x10x
Fire, Stable and Milk, 14 qt.....dis 20x10x
Remondia Faber's Carpenters.....dis 20x10x
Faber's Round Gills.....dis 20x10x
Dixon's Lead.....dis 20x10x
Dixon's 1" bar.....dis 20x10x
Dixon's Carpenters.....dis 20x10x

Picks.
Railroad, 6 to 6, \$12.00; 6 to 7, \$13.00; dis 20x10x
Adze Eye, 6 to 6, \$12.00; 6 to 7, \$13.00; dis 20x10x
Picture Nails.
Brass Head, Sargent's list.....dis 20x10x
Brass Head, Combination list.....dis 20x10x
Porcelain Head, Sargent's list.....dis 20x10x
Porcelain Head, Combination list.....dis 20x10x
Miles' Patent.....dis 20x10x

Pinking Irons.
Pipe, Wrought Iron.—List March 23, 1897,
14 and under, Plain.....dis 20x10x
14 and under, Galvanized.....dis 20x10x
14 and over, Plain.....dis 20x10x
14 and over, Galvanized.....dis 20x10x
Boulder Ruber Iron.....dis 20x10x

Flange and Flange Irons.
Wood Flange—
Moldings.....dis 20x10x
Bench, First Quality.....dis 20x10x
Bench, Second Quality.....dis 20x10x
Bailey's (Stanley R. & L. Co.).....dis 20x10x

Iron Flange.
Bailey's (Stanley R. & L. Co.).....dis 20x10x
Miscellaneous Flange (Stanley R. & L. Co.).....dis 20x10x
Victor Planes (Stanley R. & L. Co.).....dis 20x10x
Steer's Iron Planes.....dis 20x10x
Meriden Mal. Iron Co.'s.....dis 20x10x
Davis's Iron Planes.....dis 20x10x
Birmingham Planes.....dis 20x10x
Georg Tool Co.'s Self-Setting.....dis 20x10x
Chaplin's Iron Planes.....dis 20x10x
Plane Irons.....dis 20x10x
Plane Irons, Butcher's.....dis 20x10x
Plane Irons, Buck Bros.....dis 20x10x
Plane Irons, Auburn Tool Co., "Thistle".....dis 20x10x
Plane Irons, Middlesex Mfg. Co., "Baldwin" Iron,
Single and Cut.....dis 20x10x
Double.....dis 20x10x
L. & J. White.....dis 20x10x
Pliers and Nippers.....dis 20x10x
Sutton's Patent.....dis 20x10x
Wall's Pat. Compound Lever Cutting Nippers, No. 7,
6 in., \$13.50; No. 4, 7 in., \$21.00; dis 20x10x
Hudson & Beckley Mfg. Co.....dis 20x10x

Gas Pliers.....dis 20x10x
Gas Pliers, Custer's Nickel Plated.....dis 20x10x
Eureka Pliers and Nippers.....dis 20x10x
Russell's Parallel.....dis 20x10x
P. S. & W. Cast Steel.....dis 20x10x
P. S. & W. Tinner's Cutting Nippers.....dis 20x10x
Carew's Pat. Wire Cutters.....dis 20x10x
Morris Parallel, per doz, \$12.....dis 20x10x
Cronk's 4 in., \$15; 10 in., \$21.....dis 20x10x

Flange and Levels.
Regular List.....dis 20x10x
Diaton's.....dis 20x10x
Pocket Levels.....dis 20x10x
Davis Iron Levels.....dis 20x10x
Davis' Inclino-meters.....dis 20x10x

Peppers, Corn.
Round or Square, 1 qt.....dis 20x10x
Round or Square, 2 qt.....dis 20x10x
Post Hole and Tree Augers and Diggers.
Samson Post Hole Digger.....dis 20x10x
Fletcher Post Hole Augers.....dis 20x10x
Eureka Diggers.....dis 20x10x
Leed's.....dis 20x10x
Vaughan's Post Hole Auger, per doz, \$13.00 @ \$14.00
Kohler's Little Giant.....dis 20x10x
Kohler's Hercules.....dis 20x10x
Kohler's New Champion.....dis 20x10x
Jannet's Side.....dis 20x10x
Ryan's Post Hole Diggers.....dis 20x10x
Cronk's Post Bars.....dis 20x10x
Gibb's Post Hole Digger, 7 gro, \$30.00 @ \$40.00

Potato Parers.
White Mountain.....dis 20x10x
Antrim Combination.....dis 20x10x
Booster.....dis 20x10x

Pruning Hooks and Shears.
Diaton's Combined Pruning Hook and Saw.....dis 20x10x
Diaton's Pruning Hook.....dis 20x10x
S. L. Co's Pruning Tools.....dis 20x10x
Pruning Shears, Henry's Pat.....dis 20x10x
Henry's Pruning Shears.....dis 20x10x
Wheeler, M. & Co.'s Combination.....dis 20x10x
Dunlap's Saw and Chisel.....dis 20x10x
J. Mallinson & Co.....dis 20x10x

Pushers.—Hot House, Awning, etc.....dis 20x10x
Japanned Screw.....dis 20x10x
Brass Screw.....dis 20x10x
Japanned Side.....dis 20x10x
Japanned Clothes Line.....dis 20x10x
Kemp's Sash Pulley.....dis 20x10x
Moore's Sash, Anti Friction.....dis 20x10x
Hay Fork, Solid Eye, \$4.00; Swivel, \$4.50 (dis 20x10x)
Hay Fork, "Anti Friction," 5 in. Solid, \$4.70 (dis 20x10x)
Hay Fork, "P" Common and Pat. Bushed.....dis 20x10x
Hay Fork, Tarbox Pat. Iron.....dis 20x10x
Hay Fork, Reed's Self-Lubricating.....dis 20x10x
Shade Rack.....dis 20x10x
Tackle Blocks.....dis 20x10x
Pumps.—Clatern, Best Makers.....dis 20x10x
Pitcher Spout, Best Makers.....dis 20x10x
Pitcher Spout, Cheaper Goods.....dis 20x10x

Punches.
Saddlers' or Drive, good quality.....dis 20x10x
Bemis & Call Co.'s Cast Steel Drive.....dis 20x10x
Bemis & Call Co.'s Springfield Socket.....dis 20x10x
Spring, good quality.....dis 20x10x
Spring, Leach's Patent.....dis 20x10x
Bemis & Call Co.'s Spring and Check.....dis 20x10x
Solid Tinner's.....dis 20x10x
Tinner's Hollow Punches.....dis 20x10x
Rice Hand Punches.....dis 20x10x

Rail.
Sliding Door, Wrt. Brass 7 x 2 1/2.....dis 15x
Sliding Door, Bronzed Wrt. Iron.....dis 15x
Sliding Door, Painted.....dis 15x
Sliding Door, Light, Inca.....dis 15x
Par 100 feet.....dis 15x
Terry's Wrought Iron, 7 x foot.....dis 15x
Victor, 7 x foot.....dis 15x
Carroll's Steel Rail, per foot.....dis 15x
Cast Steel.....dis 15x
Walleable Lath, 1/2 inch.....dis 15x
Canton Lath, 1/2 inch.....dis 15x
Ft. Madison Prize Bow Brace and Peirless.....dis 15x
Fort Madison Steel Tooth Lath, 1/2 inch.....dis 15x
Razors.—J. R. Torrey Razor Co.....dis 15x
Westonholme and Butcher.....dis 15x

Rivet Nuts.
Genuine Emerson.....dis 15x
Imitation Emerson.....dis 15x
Torrey's.....dis 15x
Rivets' Bolt and Combination.....dis 15x
Lamont Combination.....dis 15x

Rivets and Bars.
"opper," dis 50, with Jobbers' Extras,
Iron, list November 17, 1897.....dis 50x

Rivet Sets.....dis 50x
Rods.—Stair, Brass.....dis 50x
Stair Black Walnut.....dis 50x

Rollers.
Barn Door, Sargent's list.....dis 50x
Acme (Anti Friction).....dis 50x
Union Barn Door Roller.....dis 50x

Rope.—Manufacturers' prices for large lots.
Manila.....dis 50x
Manila.....dis 50x
Manila.....dis 50x
Manila.....dis 50x
Manila.....dis 50x
Manila.....dis 50x
Manila.....dis 50x
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Manila.....dis 50x
Manila.....dis 50x
Manila.....dis 50x

Patent.....dis 20x10x
Cable Laid Italian.....dis 20x10x
India Cable Laid.....dis 20x10x
Silver Lake, A Quality, White.....dis 20x10x
Silver Lake, A Quality, Drab.....dis 20x10x
Silver Lake, B Quality, White.....dis 20x10x
Silver Lake, B Quality, Drab.....dis 20x10x
Silver Lake, C Quality, White.....dis 20x10x
Silver Lake, C Quality, Drab.....dis 20x10x
Sylvan Spring, Extra Braided, White.....dis 20x10x
Sylvan Spring, Extra Braided, Drab.....dis 20x10x
Semper Idem, Braided, White.....dis 20x10x
Egyptian, India Hemp, Braided.....dis 20x10x
Samson, Braided, White Cotton.....dis 20x10x
Samson, Braided, Drab Cotton.....dis 20x10x
Samson, Braided, Italian Hemp.....dis 20x10x
Samson Braided Linen.....dis 20x10x

Sash Locks.
Clark's No. 1, \$10.00; No. 2, \$3.00, 7 gro.....dis 20x10x
Ferguson's.....dis 20x10x
Morris and Triumph, list Aug. 16, 1896.....dis 20x10x
Victor.....dis 20x10x
Walkers.....dis 20x10x
Attwell Mfr. Co.....dis 20x10x
Reading.....dis 20x10x
Hammond's Window Springs.....dis 20x10x
Common Sense, Jan d. Cop'd and Br'sed, 7 gro.....dis 20x10x
Common Sense, Nickel Plated.....dis 20x10x
Universal.....dis 20x10x
Kempshall's Gravity.....dis 20x10x
Kempshall's Model.....dis 20x10x
Corbin's Daisy, list February 15, 1896.....dis 20x10x
Payson's Perfect.....dis 20x10x
Burgin's New and Improved Adjustable Sash Bal-
ances, list Jan. 6, 1897.....dis 20x10x
Hurns's New Sash Locks, list Jan. 6, 1897, dis 20x10x
Stoddard "Practical".....dis 20x10x
Ives Patent.....dis 20x10x
Leeche's Nos. 100 & 110, 7 gro, \$3; 106, \$10, dis 20x10x
Davis, Bronze, Barnes Mfg. Co.....dis 20x10x
Champion Safety, list March 1, 1898.....dis 20x10x

Sash Weights.
Solid Eyes.....dis 20x10x

Sausage Stuffers or Fillers.
Miles' "Challenge".....dis 20x10x
Perry.....dis 20x10x
Draw Cut No. 4.....dis 20x10x
Enterprise Mfg. Co.....dis 20x10x

Saws.
Diaton's Circular.....dis 20x10x
Diaton's Cross Cut, dis 45x10x, Extras some-
times given by
Diaton's Hand.....dis 20x10x
Atkins' Circular.....dis 20x10x
Atkins' Silver Steel Diamond X Cuts.....dis 20x10x
Atkins' Special Steel Dexter X Cuts.....dis 20x10x
Atkins' Special Steel Diamond X Cuts.....dis 20x10x
Atkins' Champion and Electric Tooth.....dis 20x10x
Atkins' Hollow Back X Cuts.....dis 20x10x
Atkins' Shingle, Mulay, Drag, &c.....dis 20x10x
W. M. & C. Hand.....dis 20x10x
W. M. & C. Champion X Cuts, Regular, 7 foot, 24x20x20x
W. M. & C. X Cuts, Thin Back.....dis 20x10x
Peace Hand Saws and Mill.....dis 20x10x
Peace Hand Saws and Mill.....dis 20x10x
Peace Cross Cuts, Standard.....dis 20x10x
Peace Cross Cuts, Thin Back.....dis 20x10x
Richardson's Circular and Mill.....dis 20x10x
Richardson's X-Cuts, No. 1, 24x; No. 2, 27x; No. 3, 24x
Hoes Saws—
Griffin's Hack Saws, complete.....dis 20x10x
Griffin's Hack Saws, blades only.....dis 20x10x
Star Hack Saws and Blades.....dis 20x10x
Diamond Hack Saws and Blades.....dis 20x10x
Eureka and Crescent.....dis 20x10x

Saw Frames.
White Vermont.....dis 20x10x
Red, Polished, and Varnished.....dis 20x10x

Saw Sets.
Stillman's Genuine.....dis 20x10x
Stillman's Imita.....dis 20x10x
Common Level, 1/2 inch, dis 20x10x
Morrill's No. 1, \$15.00; No. 2, \$4.00, dis 20x10x
Leach's.....dis 20x10x
Nash's.....dis 20x10x
Hammer, Hotchkiss.....dis 20x10x
Hammer, Bemis & Call Co.'s new Patent.....dis 20x10x
Bemis & Call Co.'s Lever and Spring Hammer.....dis 20x10x
Bemis & Call Co.'s Flat.....dis 20x10x
Bemis & Call Co.'s Cross Cut.....dis 20x10x
Aiken's Genuine.....dis 20x10x
Aiken's Imitation.....dis 20x10x
Hart's Patent Lever.....dis 20x10x
Diaton's Star, No. 15, \$5.50, dis 20x10x
Atkins' Lever.....dis 20x10x
Atkins' Critteron.....dis 20x10x
Crisant Keller, No. 1, \$15.00; No. 2, \$4.00, dis 20x10x

Saw Tees.
Atkins Perfection.....dis 20x10x
Excelsior \$6.00, 7 gro

Scales.
Hatch, Counter, No. 171, good quality.....dis 20x10x
Hatch, Tea, No. 161.....dis 20x10x
Union Platform, Plain.....dis 20x10x
Union Platform, Striped.....dis 20x10x
Chattillon's Grocers' Trip Scales.....dis 20x10x
Chattillon's Eureka.....dis 20x10x
Chattillon's Favorite.....dis 20x10x
Family, Turnbale.....dis 20x10x

Scale Beams.
Scale Beams, List of Jan. 13, 92, dis 20x10x
Scale Beams, Custer.....dis 20x10x
Chattillon's No. 1.....dis 20x10x
Chattillon's No. 2.....dis 20x10x

Scrapers.
Adjustable Box Scraper (R. E. & L. Co.).....dis 20x10x
Box, 1 Handle.....dis 20x10x
Box, 2 Handle.....dis 20x10x
Defiance Box and Ship.....dis 20x10x
Foot.....dis 20x10x
Ship, Common.....dis 20x10x
Ship, Providence Tool Co.....dis 20x10x

Screen Window and Door Frames.
Porter's Pat. Window and Door Frame.....dis 20x10x
Screen Corner Irons, Warner's.....dis 20x10x
Stearns' Frames and Corners.....dis 20x10x

Screw Drivers.
Douglas Mfg. Co.....dis 20x10x
Diaton's.....dis 20x10x
Diaton's Patent Kneeler.....dis 20x10x
Buck Bros.....dis 20x10x
Stanley R. & L. Co.'s Varnished Handles.....dis 20x10x
Stanley R. & L. Co.'s Black Handles.....dis 20x10x
Sargent & Co.'s No. 1 Forged Blade.....dis 20x10x
Sargent & Co.'s No. 20.....dis 20x10x
Sargent & Co.'s Nos. 40 & 50, Cast Steel.....dis 20x10x
Sargent & Co.'s No. 60, Round Blade.....dis 20x10x
Knapp & Cowles' No. 1 Extra.....dis 20x10x
Knapp & Cowles' No. 00 & A.....dis 20x10x
Stearns.....dis 20x10x
Gay & Parsons.....dis 20x10x
Champion.....dis 20x10x
Clark's Patent.....dis 20x10x
Crawford's Adjustable.....dis 20x10x
Ellrich's Socket and Ratchet.....dis 20x10x
Allard's Spiral, new list.....dis 20x10x
Kolb's Common Sense.....dis 20x10x

Bores, Delusion.....? gross \$18.00, dis 15 %
Bat, "Decoy".....? gross \$10.00, dis 10 %
Ideal.....? gross \$10
Cyclone.....? gross \$5.35
Hotchkiss Metallic Mouse, 5-hole traps.....? doz 90¢
In full cases.....? doz 75¢

Trawels
Lockport Brick and Plastering.....dis 28 %
Boston's Brick and Plastering.....dis 15 %
Boston's Brick and Plastering.....dis 35 % 35-10 %
Peace's Plastering.....dis 22 %
Clement & Maynard's.....dis 22 %
Rose's Brick.....dis 15 % 20 %
Grade's Brick.....dis 15 % 20 %
Hazard's Brick and Plastering.....dis 20 %
Garden.....dis 70 %
Triers - Butter and Cheese.....dis 25 %
Trucks, Warehouse, &c.....dis 40 %
L & L Block Co's list, 1883.....dis 40 %

Tubes. Bellier. - See Pipe

Twine.
No. 10, 12, 14 and 16 Balls.....22¢ 30¢ ..
No. 12, " " " and " " " 31¢ 29¢ ..
No. 18, " " " and " " " 18¢ 22¢ ..
No. 24, " " " and " " " 18¢ 22¢ ..
No. 30, " " " and " " " 10¢ 27¢ ..
No. 30, Mattress, " and " " 45¢ 50¢ ..
Chalmer, Conn. " " " " " 50¢ ..
Spring Lin. Linen.....50¢ ..
1-Ply Hemp, 1/4 and 1/2 Balls (Spring Twine).....11¢ 14¢ ..
1-Ply Hemp, 1/4 Balls.....12¢ 15¢ ..
1-Ply Hemp, 1/4 Balls.....11¢ 11¢ ..
Boston Wrapping, 5 Balls to 1.....15¢ 10¢ ..
2, 3 and 5 Ply Jute, 1/4 Balls.....10¢ 10¢ ..
Paper.....6¢ 12¢ ..
Cotton Mops - 6, 9, 13 and 15 " to doz.....15¢ 12¢ ..

Vices.
Solid Box.....dis 50¢ 10-25 % 60 %

Parallels
Fisher & Norris Double Screw.....dis 15-20 %
Stephens'.....dis 30 % 30 %
Wilson's.....dis 30 % 30 %
Howard's.....dis 40 %
Bonney's.....dis 40-10 %
Miller Falls.....dis 40 % 40-10 %
Trenton.....dis 40-25 % 40-10 %
Herrick's.....dis 40-10 % 40-10 %
Corbination Island Vice.....dis 40-10 % 40-10 %
Backus and Union.....dis 40 %
Double Screw 1-oz.....dis 15-10 %
Prestons.....dis 30-25 % 25 %
Simpson's Adjustable.....dis 40 %

Saw Vices
Market, Br. & Ann'd. Nos. 2 & 3.....? doz \$15.00, dis 4 % 210 %
Stern's.....dis 35-1/2 10 % 33-1/2 10-10 %
Stern's Silent Saw Vices.....dis 33-1/2 % 35 %
Sargent's.....dis 40-10 % 10 %
Hopkins'.....? doz \$17.50, dis 10 %
Reading.....dis 40-10 %
Wentworth.....dis 40-10 %
Corbination Island Vice.....? doz \$17.50, dis 10 %
Cowell Hand Vices.....dis 30 %
Bauer's Pipe Vices.....dis 10 %

Wagon Boxes.
Per lb.....2-4 %

Wagon Jacks.
Washer Cutters.....? doz \$4.00, dis 35 %
Patent.....? doz \$12.00, dis 40-10-10 %
Johnson's.....? doz \$11.00, dis 33-1/2 %
Penny's.....? doz Pol. \$14, \$10, \$10, dis 60 %
Appleton's.....? doz \$11.00, dis 40-10 %
Bonney's.....dis 30-10 %

Washers.
size.....1/4 5-16 3/8 1/2 5/8 3/4 1
In lots less than 200 lb. ? lb. and 4 lbs. 5 lb boxes 1¢ to list

Wedges. - Iron.
Steel.....? lb 2-4 %

Well Buckets. Galvanized.
Hill's.....? doz 13 qt., \$4.25, 14 qt., \$5.25
Hill's.....? doz 14 qt., \$4.25, 14 qt., \$4.50
Whiting's Flat Iron Sand.....? doz \$4.25, \$4.50
Whiting's Wired Top.....? doz \$4.00, \$4.25
Well Wheels - 3 in., \$2.35; 10 in., \$2.70; 12 in., \$3.27.

Wire.
Market, Br. & Ann'd. Nos. 0 to 18.....dis 67-1/2 75-25 %
Market, Corbination, Nos. 0 to 18.....dis 70-70 70-25 %
Market, Galvanized, Nos. 0 to 18.....dis 65-10 %
Market, Tin'd, Tinned list Nos. 0 to 18.....dis 67-1/2 67-1/2 25 %
Stone Br. & Ann'd. Nos. 18 to 18.....dis 71-1/2 67-1/2 25 %
Stone, Bright & Ann'd. Nos. 19 to 20 dis 75-25 75-10 %
Stone Br. & Ann'd. Nos. 27 to 30.....dis 75-10 67-1/2 25 %
Stone, Tin'd, Tin'd list, Nos. 18 to 36, dis 70-10 70-10 %
Tinned Broom Wire, Nos. 18 to 24.....dis 72-1/2 75-10 %
Galvanized Fence.....dis 65-25 25 %
Annealed Fence, Nos. 8 & 9.....dis 75-75 25 %
Annealed Grape, Nos. 10 to 14.....dis 15 % 20 %
Brass Music Copper, list, Jan. 15, '94.....dis 15 % 20 %
Brazed Fence.....See Trade Report
Wire on Spools.....dis 65 %
Malin's Steel and Tinned Wire on Spools.....dis 60 %
Malin's Brass and Copper Wire on Spools.....dis 40 %
Cast Steel Wire.....dis 60 %
Subs' Steel Wire, Nos. 10 to 14.....\$5.00 to \$8, dis 60 %
Music Wire, Nos. 18 to 30.....dis 65 % 65 %
Picture Wire.....dis 60-10 %
Barb Wire Safety Guards.....? 1000 90.00, dis 25 %
Wire Clothes Lines. See Line.

Wire Cloth, Netting, &c.
Painted Screen Cloth, No. 34, ? 100 sq. ft.....\$1.90
Painted Screen Cloth, No. 35, ? 100 sq. ft.....\$1.90
Galvanized Wire Netting.....dis 70-10 % 75 %

Wire Goods. - See Bright Wire Goods.
Wire Rope. - List May 1, 1886.....dis 23 %
Wrenches. - American Adjustable.....dis 25 %
Baxter's Adjustable " ".....dis 40-10 % 50 %
Baxter's Diagonal.....dis 40-10 % 50 %
Cox's " Mechanics.....dis 55-10 10-25 %
Girard Standard.....dis 70-10 %
Lamson & Sessions' Engineers'.....dis 60-10 %
Lamson & Sessions' Standard.....dis 70-10 %
Cox's Pattern, Wrought.....dis 60 %
Girard Agricultural.....dis 60 % 50-25 %
Sterling Wrought.....dis 60 %
Bemis & Call's Patent Combination.....dis 25 %
Bemis & Call's Merrick's Pattern.....dis 25 %
Bemis & Call's Rynders' Pattern.....dis 25 %
Bemis & Call's Cylinder or Gas Pipe.....dis 40-25 %
Bemis & Call's Pipe.....dis 25 %
King's Pocket (Bright).....\$4.00, dis 50-10 %
The Favorite Pocket (Bright).....? doz \$4.00, dis 40 %
Webster's Patent Combination.....dis 25 %
Boardman's.....dis 30 % 35 %
Always Ready.....dis 25 %
Alligator.....dis 30 %
Lamson & Sessions'.....dis 60 %
Acme, Bright.....dis 60-25 %
Acme, Nickled.....dis 10-25 %
Walker's.....dis 50-25 %
Diamond.....dis 40 %
Diamond Patent Steel.....dis 40 %
Wringers, Clothes.....dis 40 %
List Jan. 10, 1890 off.

Wrought Goods.
Staples, Broom, &c., 12 Jan. 12, '97, dis 50-25 50-25 %

THE IRON AGE

THURSDAY, JULY 19, 1888.

The Iowa Distance Tariff.

The Jobbers' and Shippers' Association of Dubuque, Iowa, have been informed by the Iowa Railroad Commissioners that the new distance tariff for Iowa railroads

ers. Under the law the suits must be brought by the latter whenever a violation of the law is called to their notice. The penalty for the first offense is a fine of not less than \$1000 nor more than \$5000; for each subsequent violation not

Turbines at the Terni Steel Works.

Turbines, with vertical or horizontal axes after the Girard system, have for some time been employed in preference to those of other systems wherever the quanti-

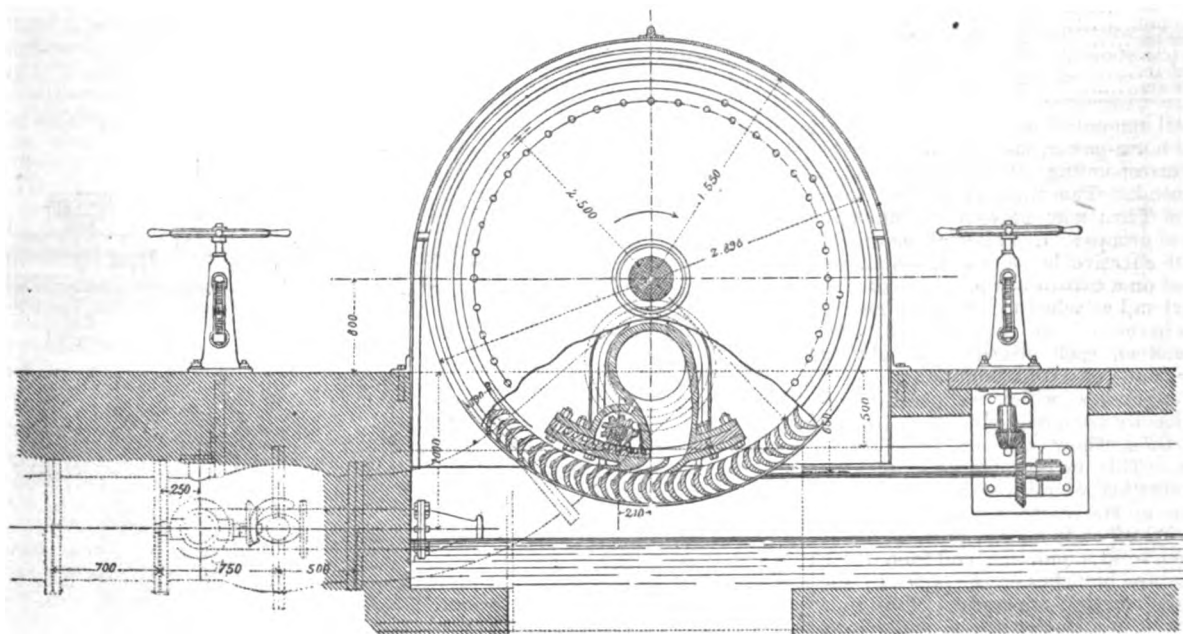


Fig. 1.—Elevation.

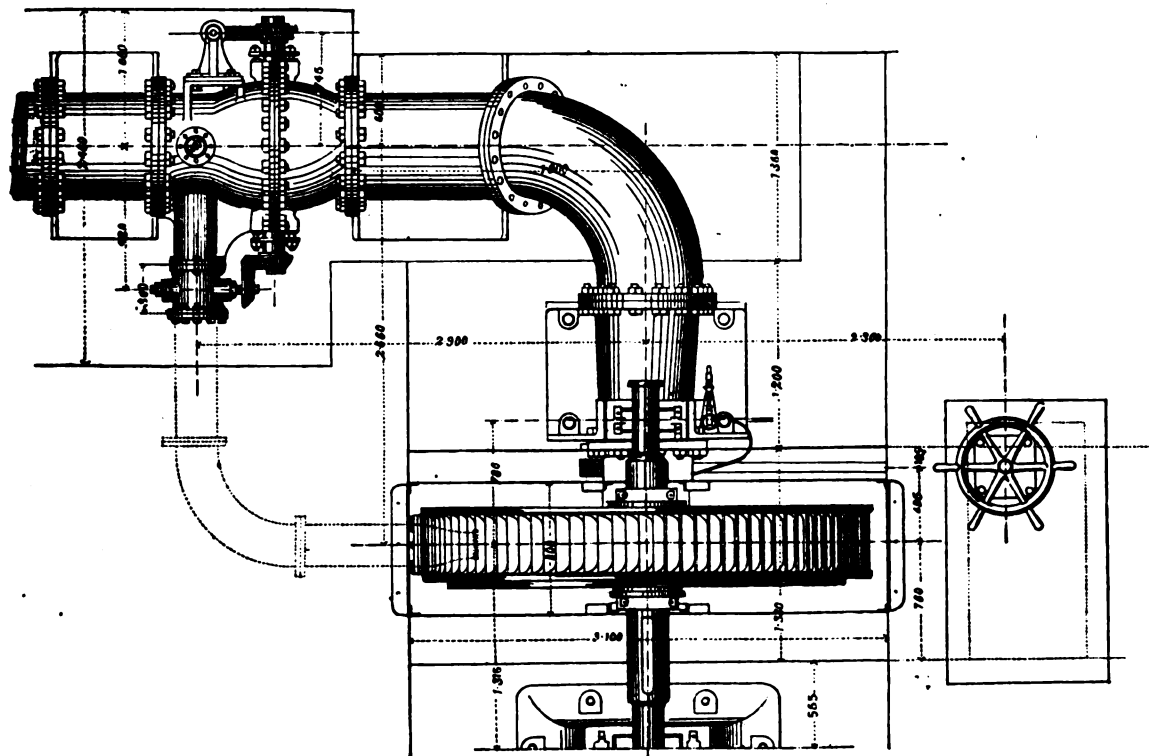


Fig. 2.—Plan.

VERTICAL TURBINES AT THE TERNI STEEL WORKS, TERNI, ITALY.

went into effect on the 10th inst., notwithstanding the intervention of the courts invoked by the railroads. As a consequence, the Dubuque shippers now announce their purpose to prosecute any company making a freight charge in excess of the rate fixed by the Commission-

less \$5000 nor more than \$10,000. The Commissioners may dismiss suits with the consent of the Attorney General of the State. The officers of a railway company making excessive charges may also be indicted and the penalty recovered by criminal prosecution.

ties of water to be utilized are variable, where the height of fall to be utilized is constant and the lower level of water consequently does not rise or vary. A certain number of these turbines has been set up at steel works at Terni, Italy, by the constructors, M. M. J. J. Rieter & Co., of

Winterthur, Switzerland, to furnish the motive power required. These motors work the following machines:

Designation of the machines and apparatus.	Motive power in horse-power.	Quantity of water, liters per second.	Revolutions per minute.	Diameter of the turbines
General rolling mill.	1,000	500	180 to 240	2.400
Mill for rails.....	800	450	200	2.500
Mill for tires.....	500	280	240	1.800
Train of 500 mm. mill	350	200	200	2.500
Train of 280 mm. mill	150	85	250	1.950
Movable crane.....	50	28	850	0.565
Great pump.....	50	28	850	1.070
Great shears.....	40	24	450	1.070
Mill for iron plate....	40	24	450	0.800
Small pump.....	30	17	600	1.070
Small shears.....	20	12	450	.....

The total amount of motive force is equal to 3030 horse-power, and the quantity of water corresponding with this is 1708 liters per second. The turbines of the steel works of Terni may be divided into two principal groups: 1. The small motors of 20 to 50 effective horse-power, which are mounted on a cast-iron frame, and can be removed and attached to the machines to be set in motion as required. 2. The great motors, each placed separately on masonry and concrete foundations.

The engravings which we publish and for which we are indebted to *Les Annales Industrielles*, show one of these great motors. This turbine works a mill for the production of railway rails; its force is equal to 800 horse-power. There are guides bolted on to a large pipe, which is fixed to a solid foundation, and from which a water-pipe branches on the opposite side to the distributing apparatus. This pipe is 600 mm. in diameter inside, and allows for a discharge of 450 liters per second. The head of water is 180 m., equivalent to about 270 pounds on the square inch. In order to resist this great pressure, the

is placed sufficiently above the ground to permit its being easily worked. The motion of this wheel is transmitted by means of bevel gear to a cog-wheel, which is placed in the interior of the sluice, and the advance or recoil of the latter is thus produced. Figs. 4 and 5 represent the sluice and a part of the wheel on a larger scale than that of the whole turbine. The distributing apparatus is furnished with two admission orifices, by which 0.345 m. of water can be introduced. The radial

is quickly stopped and set in motion again. The high pressure brought to bear upon the distributing apparatus would not have permitted this quick arrest and restart without a very complicated disposition of the sluice. For this reason the admission valve is only employed in exceptional cases, and the sluice is worked by means of the wheel previously described, and which can be managed by a single man. But in order to avoid damaging shocks to the pipes when the admission is abruptly

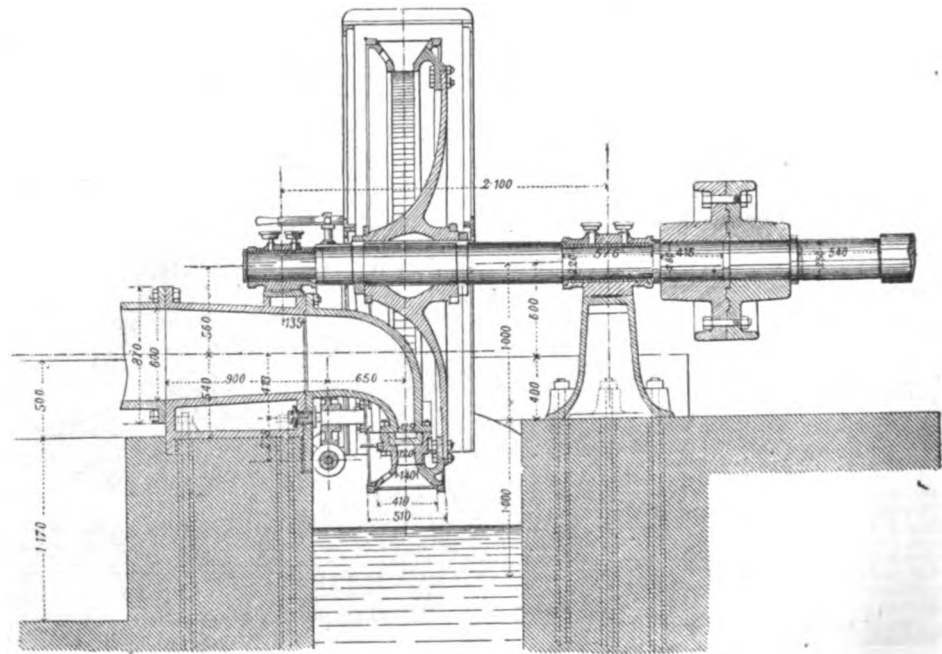
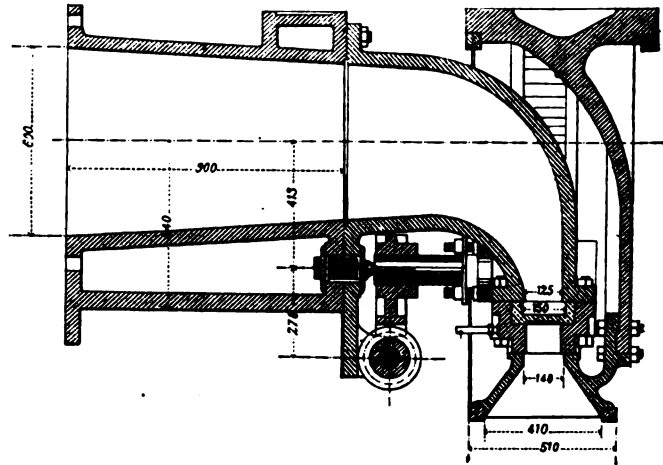
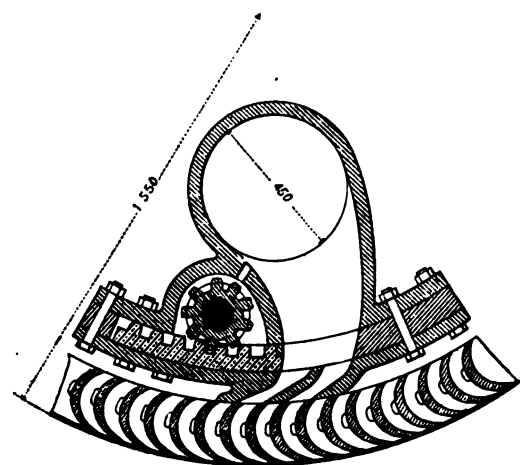


Fig. 3.—Cross Section.



Figs. 4 and 5.—Detail of Guide and Buckets.

VERTICAL TURBINES AT THE TERNI STEEL WORKS, TERNI, ITALY.

thickness of the water-pipe, as well as those of the movable wheel and of the fixed guide-wheel, is considerable. The interior diameter of the movable wheel is 2.5 m., and it makes 200 revolutions per minute, so that it has had to be constructed with great care. Referring to the resistance of the wheel-rim to the centrifugal force which is developed, it should be noted that the cast iron employed for the wheel is very hard; the rim of the wheel is further strengthened by two steel rings welded up and shrunk on. It is united to the boss by a stout disk, so that the whole constitutes a very massive construction. The admission is regulated by a hand-wheel placed suffi-

ciently above the ground to permit its being easily worked. The motion of this wheel is transmitted by means of bevel gear to a cog-wheel, which is placed in the interior of the sluice, and the advance or recoil of the latter is thus produced. Figs. 4 and 5 represent the sluice and a part of the wheel on a larger scale than that of the whole turbine. The distributing apparatus is furnished with two admission orifices, by which 0.345 m. of water can be introduced. The radial

shut off a pipe has been placed in front of the large valve, which contains a smaller one. These two valves are united together by a gearing, so that the opening of the one causes the closing of the other, and *vice versa*, and there is no fear, therefore, of a rupture of the water pipe. The necessary quantity of water to work these turbines is brought by a long canal through two tunnels. The interior diameter of the pipes is 770 mm. The spirit of opposition to all corporate power is seen in the passage by the House of a general land forfeiture bill, as a substitute for one previously passed by the Senate of a less sweeping character.

The Mission of Mechanical Engineering Schools.*

In a paper read last month before the American Society of Mechanical Engineers, one of the members who has practically contributed to the progress of the printing press, presents "A Plea for the Printing Press in Mechanical Engineering Schools." It is an honest plea, courteously uttered, and with an evident desire in no way to disparage the value of the training secured in engineering schools. The writer maintains that while the printing press shares perhaps alike with the steam engine, the fame as a great civilizer, no attention is given to it in any specific way in the leading engineering schools; that no books relating to it are studied or referred to; no lectures delivered detailing its mechanism; that its factories are not inspected by the students, and that no sample machines adorn the schools' laboratories of engineering. All this is inferred by the writer from a perusal of the catalogues. Usually judgment as to the course of studies pursued, if based solely on the catalogues themselves, is a dangerous procedure, apt to lead to fatal errors, but in this case no mistake is made, for it is a fact that the printing press receives but little, if any, attention in the engineering schools.

What should be the relation of the course of study pursued in the schools of mechanical engineering to these ever increasing important industrial engineering applications?

Should every new, important mechanical device, especially if it brings with it new fields of practical employment and labor for the engineer, immediately find its place as a study in the engineering school?

If this be so, the school of mechanical engineering will have to extend its term of study an indefinite extent, and ere long it will come to pass that the young student, entering as a beardless youth, will graduate from the school as a gray-haired man in the decline of life. For, surely, if every important machine is to be the subject of special study in the technical school, a lifetime will only suffice to cover the ground. And the result?

The result would be that the engineering schools would be of no use to the world, for the world's engineering work would be being done by outsiders, while the gray-haired students, plodding along, would be kept busy studying this very work and not be active agents in its development. It is the mission of the technical school to inculcate the principles of engineering, to train and mature the powers of observation and mechanical judgment, and, after teaching the laws of physics and mechanics, to give the ability to apply these laws to problems arising in machinery and the industrial arts. The special machines and appliances dwelt upon in the school should serve this one purpose; a knowledge of them should not be the end, but the means. Because we can best inculcate and supplement a correct understanding of the physical laws and a knowledge of how to apply them to the design of machinery by studying the successful applications made, therefore such study should form an important factor in the course of the technical school.

These engines, motors, machines, factories and engineering works should serve as the constant tests and checks of the student's efforts at individual design. When the student has once acquired the ability to put physical principles and experimental data into the best engineering forms, bearing in mind economy of material, with least sacrifice of strength, best method of handling, management and the like, he

comes equipped to struggle with new machines of which he has had no previous special knowledge. The school cannot give to the student all this desirable latent power, or stored energy, for much of it must come in later life from individual, unaided effort; and the experiences of daily application (often coupled with some degree of failure) must be the teachers which never leave the side of the devotee of engineering science. But these teachers are most efficient, if the student has been trained in the engineering school both and ever to reason before beginning work, and to check his previous reasoning by the results secured.

If we regard the technical school from this aspect, it is plain why the various prime movers play so important an element in the course of instruction, to the disadvantage of other possibly equally important machines. They are the most direct applications of very important and leading laws of physics, and the intelligent discussion of the prime movers calls for quite a knowledge of these laws, both in experimental and mathematical form. The problems of mechanics are splendidly embodied in the design of the various parts, and in many diverse ways, modified as is the application by the strains to which the parts are submitted, the strength of the materials and the practical methods of their working. Every conceivable strain, simple and compound, since it enters the working of the steam engine, for instance, comes up for consideration, while all the leading materials enter its construction. The prime movers act as fine checks on the student's individual efforts at design, for they represent the embodiment of centuries of application and development by the best engineering talent. They give opportunity for experimental verification of the laws of physics and mechanics as well.

I fully appreciate the view that it is commendable, indeed desirable, that the students, when graduating from technical schools, should possess some general knowledge of the leading machines in the market, but the first essential thing is that they should have acquired the ability to be useful workers in every field, by being possessed of a knowledge of the principles and methods of procedure which underlies all engineering works and machines and their design.

It has occurred to me that some of the theoretical preparatory studies pursued, such as mathematics, physics, chemistry and the like—and I purposely omit languages, belles-lettres, and those general academic branches having a less intimate connection with the engineering course—seem not to be carried out in some particulars so as to secure the highest efficiency from an engineering point of view.

Let me call your attention to this point: Is it not remarkable that essentially the same text-books on physics, chemistry, analytical mathematics, descriptive geometry and the like are studied at engineering schools as at the ordinary academic course of a university? Does not this fact of itself almost imply that the studies, as pursued, are not made to specially adapt themselves to the needs of the applied studies of the engineer? Could not some abstract developments, now dwelt upon at length, be advantageously omitted, while physical experiments and applications in heat, electricity and the like be more copiously introduced as exercises, both with the view of imparting a thorough hold on the abstract taught, and also as imparting requisite useful information and methods of procedure? It is my opinion that, in the application of mathematics to physical problems, even the mathematician, and certainly the engineer, can best test and master a knowledge of the mathematics themselves. How common is the experi-

ence of those who, having acquired in the usual way, even from the best of masters, what they considered a pretty fair hold on calculus—and this embraces the experience of many gifted students—when they tried to apply this knowledge in the study of the mechanical theory of heat, they found they really had no thorough grip on the calculus as they had presumed, and had, in fact, to start anew, with a decided loss of time, which might, it seems to me, have been avoided.

I concede the value as fully, and am as anxious as any one to guard the pursuit of knowledge in the abstract on its own account. Still, I say, why not in plane, solid, descriptive and analytical geometry, and in calculus and other analytical mathematics, gain some time now devoted to the elucidation of abstract propositions and detailed elaborations in various forms of the same propositions, of no direct value, and some time now devoted to applications, which, designed to test the understanding, are really essentially numerical substitutions, so as to find leisure to supply physical problems as a test. The latter problems best serve to call forth a true knowledge of the principles. It is only in such application that we discover whether we have really grasped and actually secured the full meaning of the principle. So, too, in the course of physics, as pursued in mechanical-engineering schools, some details now studied, from force of habit and as being the regular thing in a complete course of physics, might, it appears to me, be advantageously omitted and replaced by special and more extended work in heat, electricity, elasticity and the like.

Anti-Corrosive Propeller Blades.

According to recent English accounts Mr. John Willis, of the firm of John Willis & Co., Specialty Steel Works, at Attercliffe, claims to have discovered a new method of preserving iron and steel propellers, blades, &c., from corrosion. Seagoing engineers and shipowners know that corrosion sets in very quickly upon the back of propeller blades, and to a greater extent in steel than in cast iron. The first cost of manganese bronze or gun-metal blades weighs seriously with shipowners; and it is, therefore, of the highest importance to look to the improvement of iron and steel blades. Mr. Willis's invention consists in a coating of copper united to the casting. This is effected by the copper plate, properly bent to shape, being placed in and forming part of the mold into which the iron or steel is poured, with the result that the copper is firmly united by fusion to the iron or steel face. All anti-corrosive metals are covered by the patent. Several of these are now undergoing tests to ascertain the most suitable for this purpose. Specimens of steel and copper united in this manner have been exhibited. There appears to be a perfect joint, the steel and copper being fused together and thoroughly united. It may be added that the blades can be totally coated if considered desirable.

The Hibernia Works, of Sheffield, announce, under date of July 2, that Albert Marples has retired from the business, and that it has been arranged that Harry Edgar Marples and Edward Albert Marples, sons of the senior partner, shall be taken into the firm, which will be conducted under the firm of William Marples & Sons, as heretofore.

If carried into execution, the contemplated improvements of the Point Breeze, N. J., company, will secure for business purposes extensive piers and basins to be excavated from the mud flats on the New Jersey shore.

* From Presidential Address delivered before the Alumni Association of Stevens Institute of Technology, June 18, 1888, by A. R. Wolff

Joints of Pipes and Fittings.

It is a noticeable fact that with the general and increasing use of pipes the question of joints has been little discussed, and the methods of making joints have remained almost unchanged. The cast-iron hub and spigot joint, Fig. 1, caulked with iron borings, is probably the oldest kind of joint. This is still generally adopted in hot-water heating of

and the use of a gasket of rubber, copper, paper or cement, with bolts for drawing the faces together. These joints for cast-iron pipes have not been changed excepting for some classes of work where a lip and recess, Fig. 3, is formed on opposite flanges, which make the internal surfaces smooth and aid in preventing the gaskets from being blown out.

In wrought-iron pipe work the general practice in making joints between pipes

pipe, and the internal projection of the thickness of the pipe and that of the thread of the fitting increases materially the friction due to the interior surfaces of pipe and fitting. This class of joint requires care in the tapping of the fittings and in the cutting of tapered threads on the pipes, and much trouble is caused by an inaccurately cut thread, as it may throw a line of pipes several inches out of place and put fittings and joints under undue and

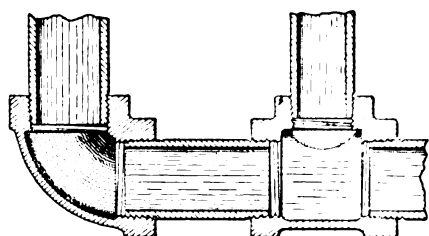


Fig. 5.

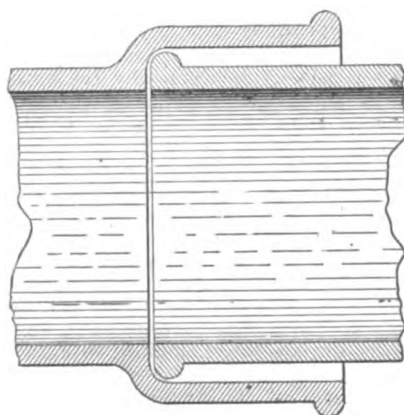


Fig. 1.

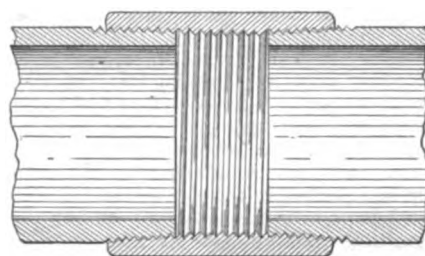


Fig. 4.

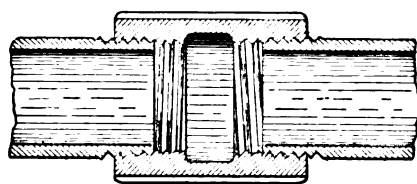


Fig. 6.

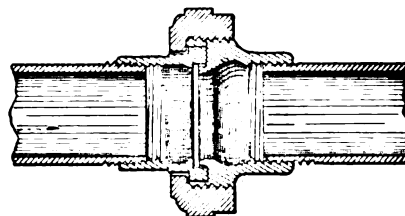


Fig. 7.

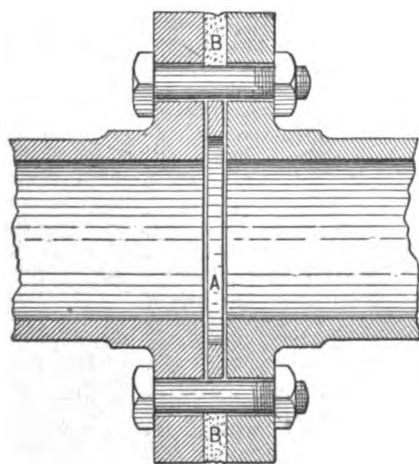


Fig. 2.

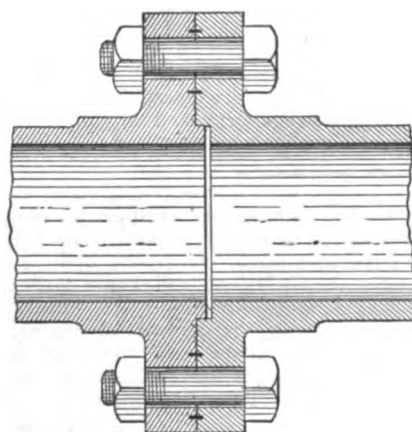


Fig. 3.

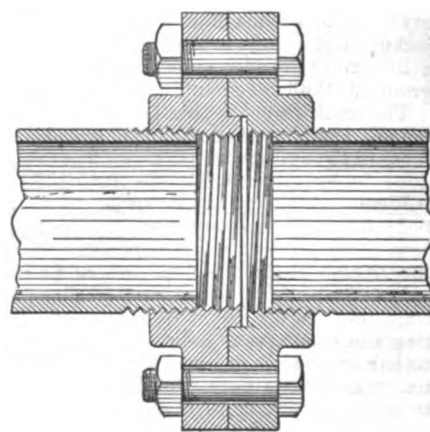


Fig. 8.

JOINTS OF PIPES AND FITTINGS.

a certain class, and was formerly used with low-pressure steam. A fairly regular smooth internal surface is obtained, and once made tight, is very durable. Cast-iron flanged pipes have also been a long time in use. These joints were first made with a wrought-iron ring gasket, wrapped closely with yarn, A, Fig. 2, which was sometimes dipped in a mixture of red and white lead. It was then placed between the flanges, it being of such a diameter as to fit within the bolts by which the joint was screwed up and a nest or iron joint, B B, caulked outside the annular gasket between the faces of the flanges. The next step in cast-iron flange pipe-joints was the facing or turning up of the flanges

is a wrought-iron coupling, Fig. 4, with tapered threads at both ends. These couplings are liable to extend or expand under the internal pressure of the tapered end of pipe while being screwed in, to prevent which heavy cast-iron couplings or flanges are used in certain classes of work. The pipes do not meet at their ends, and a recess of about $\frac{1}{4}$ -inch or more long by the depth of the thickness of the pipes is left at every pipe end. A similar tapered thread is used in connecting the cast-iron fittings, elbows, tees, &c., Fig. 5, to the pipe, and a large recess is necessary in each fitting to allow for the tapping of the threads. Thus the inside diameter of the fitting is larger by $\frac{1}{8}$ inch than the outside diameter of the

irregular strains. The right and left threaded nipple, Fig. 5, is used as a finishing connection joint and between fittings. To make up this joint time and care are necessary, and even then its tightness is problematical until tested. The right threaded end on nipple should be first firmly screwed with the tongs or wrench into the right threaded end of fitting, then slacked out and screwed up again by hand until tight, when it is screwed back by hand, at the same time counting the number of threads it has entered by hand. The same is done with the left threaded end of nipple and fitting. If the right and left threads of nipple have counted the same number of threads, each

thread, when making the joint up, should enter the fittings at the same time if possible, and particular care must be taken that the fittings are exactly opposite, to facilitate catching on, prevent crossing threads, and that no irregular strain comes on the nipple while being screwed up. If these joints leak when tested and if screwed in further when warm, or after being treated when cold, the joints of both threads are not always certain to tighten up equally and at the same time. The right and left coupling, Fig. 6, involves the same amount of work and care.

The long screw-nipple, with coupling and faced lock-nuts, is another method of joining pipes and fittings. It consists of a nipple with a long parallel thread on one end, of sufficient length to receive coupling and nut, the other end having a short tapered thread, which is screwed into the

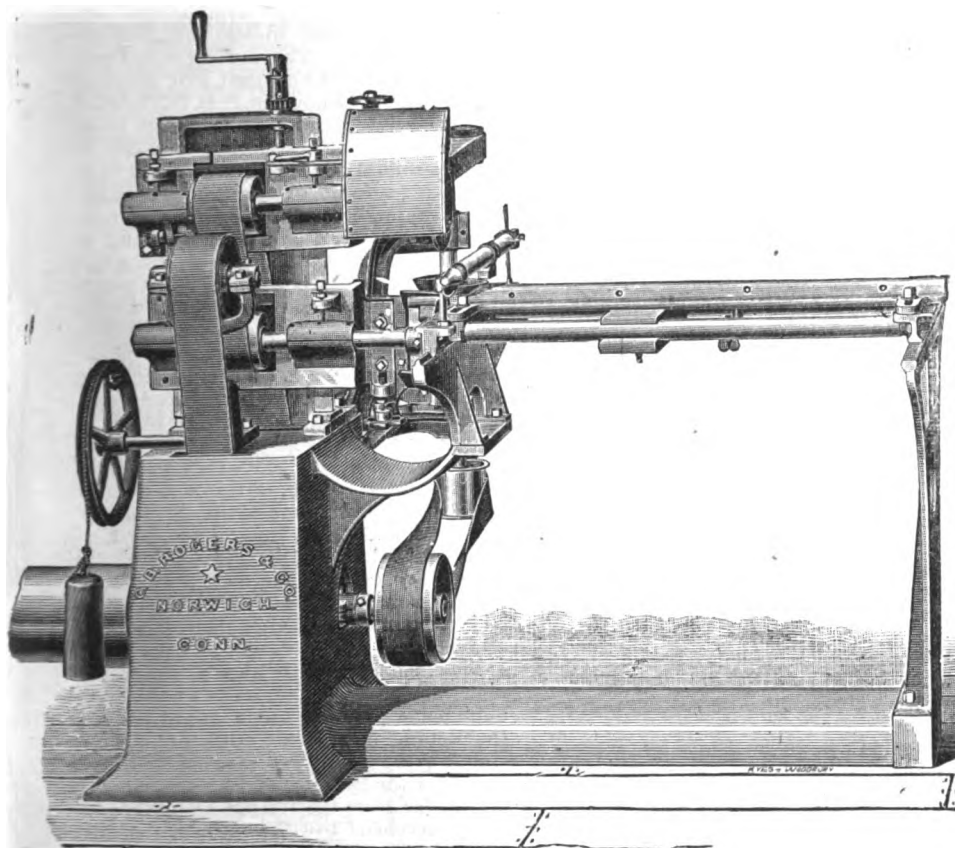
time is occupied in counting, fitting and screwing them into position. When top and bottom connections are made between sections of radiators, each right and left nipple has to be screwed in alternately half a turn at a time to prevent binding or crossing threads, and to remove a section from between others the radiator has to be moved apart a distance equal to at least the length of the nipple. To avoid the use of these right and left nipples in connecting sections of radiators a long bolt through or near one set of joints is used, while close nipples are used in the other joints. It is not, however, generally considered good practice to risk from five to thirty joints on one bolt, especially when the compression which the sections undergo from expansion is taken into account. However, this bolted point has in some instances given good results, but not in all.

these flanges is first ascertained, and the exact length that the pipe has to be cut is approximated in order to allow for the screwing up of the threads of the pipe and flanges. In screwing up the flanges, the holes for the bolts have to be located so as to meet those in the existing flanges. The pipe with flanges is then lifted into place, and the gaskets dropped between the flanges, the bolts are inserted and screwed up. The gasket joint between flanges may be tight, and the threaded joints of pipe to flanges may leak, and if the leak is serious there is only one remedy, which is to break the bolted joint and screw up the flange another turn. To summarize the peculiarities of the present method of joining wrought-iron pipes and fittings, it is only necessary to call attention to a few facts. With the union as well as the flange union, three joints have to be made tight, to obtain one required joint. In the wrought and cast-iron coupling, be it with right, or with right and left threads, two joints have to be secured to obtain one connection; and in the pipe and fitting, no single joint can be tightened up while in position without the loosening of another joint. No pipe between ordinary fittings can be removed without breaking the fitting or cutting the pipe. Thus it is that so much time is wasted in fitting up a pipe system, and an improvement in the construction of joints will aid materially in a still more general adoption of steam and hot-water heating.

New Pedestal Tenoner.

Messrs. C. B. Rogers & Co., of Norwich, Conn., and with warerooms at 109 Liberty street, New York, are bringing out a new pedestal tenoner shown in the accompanying engraving. In the design and construction of this machine they have embodied all of the best features of the style of tenoner formerly produced by them, and in addition have introduced new and thoroughly practical ideas. As will be seen in the cut, all of the working parts of the machine are supported on a heavy iron frame, cast in pedestal form, and to which at either side are attached the boxes for the main countershaft. Attached to this column, and cast with it, is an arm with V track that supports one end of the carriage or table, the other end being supported by a smooth-way attached to an extension of the foot or base of the machine. With this arrangement of the way the operator is enabled to follow the carriage right up until the work has passed the cope cutters. The cutters' heads, with straight cutters set for a draw cut, are attached to heavy steel spindles, running in self-oiling connected boxes, to which are also hung the cope-heads, the whole being gibbed to the upright. By an ingenious arrangement the heads are raised and lowered independent of each other, or may be adjusted together to any desired height above the carriage without altering their relative positions. The copes being hung on the same yoke with the tenoning heads, when once set, require no further attention; they are, however, provided with both horizontal and lateral independent adjustment. The pulleys on the cutter-head spindles, as well as the main driving pulley on the counter, are placed between the bearings, and all the other pulleys placed close to the bearings, adding much to the stability and capacity of the machine. The arrangement of this machine is such that every necessary adjustment may be made from the operator's position in front of the carriage.

The frequency of lead poisoning in Newark, N. J., excites much inquiry respecting the cause. One physician suggests that it may be the use of patent stoppers, such as are used in bottles.



PEDESTAL TENONER, BUILT BY C. B. ROGERS & CO., NORWICH, CONN.

fitting. The long screw end of nipple is brought close to end of pipe to which it is to be connected; the coupling is then screwed tightly up on tapered thread on pipe, leaving about half the coupling on long screw of nipple, and the lock-nut is screwed up against coupling, packing being inserted sometimes between the faces of it and the lock-nut. Close nipples are used for another joint. It is a short nipple with all its external surfaces threaded, it having tapered right threads from the center to the outer ends. These nipples are liable to be cut inaccurately on account of the difficulty of holding them. They are used where fittings come close together and in connecting the links or sections of direct radiators having no bases.

There are, besides, right and left threaded nipples of malleable or cast iron, with hexagonal or round centers between the threads, by which the nipples can be turned, and also close right and left threaded nipples with interior flats or projections for an internal wrench. These are used for connecting sections of indirect and direct radiators. Much accuracy is required in their manufacture and the tapping of the holes for them, and much

Another joint in wrought-iron piping is known as the "union," Fig. 7. A union is composed of three pieces and the washer, and when placed complete in position six threads have been cut and tapped, and care must be taken to have the faces of the union square, exactly opposite one another, and close together. Unions are also made with ground joints, and the washer dispensed with. Radiator valves are now generally connected by them, but if the hole in the radiator is not tapped accurately the union when drawn up will not be tight, or if tight the valve will not be straight.

The flange union, Fig. 8, is another joint generally used on wrought-iron pipes above 4 or 5 inches in diameter in making connections to valves, &c., and on smaller pipes in positions where it is a convenient joint. This joint consists of two circular cast-iron flanges with the requisite number of holes for bolts, and central hole tapped tapered to receive thread of pipe. The abutting faces of the flanges are generally turned and the holding bolts fitted into the holes. To fit up a piece of wrought-iron pipe between two flanges already in position, the distance between

Underground Electric-Light Wires in Europe.

A Milan (Italy) correspondent of *Industria* contributes the following interesting particulars to the subject of underground wires for electric lighting in that city:

Milan was one of the first cities in Europe in which the distribution on a commercial basis of electric light from a central station has been in continuous operation for nearly five years, and has steadily increased its capacity year by year, maintaining its claim to be the largest electric light station on the Continent. It has passed through various phases of development, supplying at first only incandescent lamps in multiple arc, and then successively adding arc lamps supplied from the incandescent lamp circuits, an independent arc system, and finally the alternate current system. These systems require different types of conductors, with varying degrees of insulation adapted to the different currents and pressures. At first, while the station supplied only incandescent lamps on the Edison two-wire system, the requirements as regards insulation were moderate; but with the application of new systems, operated with pressures of 1500 to 2000 volts, and both direct and alternate currents, new conditions presented themselves, and more particularly in the circuits that were laid underground.

The Milan installation, as at first projected, supplied only Edison lamps from a general underground network, as usually adopted in Edison stations, and in which a constant pressure is maintained by feeders. Edison tubes were at first exclusively used, but on the introduction of the arc lighting system a new type of conductor had to be adopted. The conductors for the supply of the Edison incandescent lamps are all underground, and comprise at present over 13 km. (8.1 miles) of Edison tubes (two-wire system) and 1 km. (0.6 miles) of Siemens cable. For the series arc lighting the Thomson-Houston system is used, only part of the circuits being underground. For this purpose single conductor, lead covered and armored Siemens cables are used, and of this type about 6½ km. (4 miles) have been laid. A Siemens double-conductor concentric cable, having a length of 1.8 km. (1.1 miles), supplies a number of incandescent lamps at some distance from the station, on the Zipernowsky-Deri system. We have thus installed in Milan at present a total length of underground conductors amounting to 22.3 km. (14.2 miles). These several lighting systems are representative of the various conditions of supply which a well-equipped station is called upon to meet, and a few details of the various conductors used, and their electrical properties, may be of interest.

The construction of the Edison tubes is too well known to merit a detailed description. Suffice it to say that in Milan the two-wire system tubes are used with the lamps in simple parallel. In the underground conductor network the tubes are of two classes—mains and feeders. The former have a constant sectional area of 92 sq. mm. (0.14 square inches), and represent a total length of 8 km. (5 miles). The feeders have sectional areas varying from 250 sq. mm. (0.386 square inches), and lengths varying from 118 m. (387 feet) to 690 m. (2260 feet), representing a total length of 5 km. (3.1 miles) in tube lengths of 6.2 m. (19 feet) each. In the case of feeders, the large number of joints which the use of such short conductor lengths entails is not advantageous and not necessary, as feeders have no derived circuits, and run from the station straight out to the point at which they are attached to the distributing mains. These conductors

carry currents as high as 400 and 500 amperes, with a pressure of 110 volts, and require to be fairly well insulated, as a short circuit of heavy earth in conductors of such a large sectional area might compromise the regularity of the station service. The insulation resistance between the copper segments is usually higher than the insulation to earth, which in the different feeders, after having been in use for five years, varies from a minimum of ½ megohm up to 150 megohms. Cables are to be preferred for feeders, as they may be laid without intermediate joints, or with a relatively small number of such joints, rendering it less difficult to obtain and maintain a higher insulation resistance than in the case where tubes are used as feeders. For one of the feeders a Siemens single conductor lead covered and armored cable is used for each pole of the circuit. The cable has a sectional area of 625 sq. mm. (0.96 square inches), formed of 35 strands of wire, each wire having a diameter of 4.77 mm. (No. 7 B. W. G.). The resistance per kilometer is about 0.0253 ohm.

The cable is provided with a testing wire, which permits of the application in the station of a voltmeter showing the pressure at the feeder terminals, where they are attached to the distributing mains. The stranded core has an insulation of specially prepared hemp, over which follows a lead covering, which is in turn served with a layer of tarred hemp, and the armor consists of two spiral iron bands wound in opposite directions, and served on the outside with a layer of tarred hemp. The external diameter of the cable is about 2.2 inches. The cable has a total length of about 1000 m. made up of lengths of 100 m. each, joined by heavy copper clamps in suitable junction boxes, which are filled with a special insulating compound. The insulation to earth of each pole of the cable has not varied sensibly since it was first laid down some six months ago. This cable has been daily carrying a current of 350 amperes at 110 volts, and the insulation remained constant at about 750 megohms per kilometer of conductor. The cable was delivered in coils of 100 m., which were mounted on a drum supported by an axle spanning the ditch into which the cable was to be laid, high wheels on the sides serving to move along the drum while the cable was being unwound.

The conductors (tubes or cables) are laid in ditches at a depth of 25 to 30 inches below the street level, and the cables are unrolled from the drum right into the ditch. The conductor (tube or cable) having been covered with a layer of earth to 3 or 4 inches, a rough charred and tarred plank is laid over them, to give warning to any future diggers of the proximity of the conductors, and the ditch is then filled up and the paving made good. This simple expedient of laying a board over the cables has saved them from many a pick hole. The Edison tubes were given an extra coat of tar paint before laying in the trenches; but in Milan, which is sadly in need of a complete sewage system, the leakage from the roughly constructed sewage conduits has in many places attacked the iron of the tubes. The streets are built up over the *débris* of the habitations of past generations, and the soil in such localities would in time have ruined the tubes. To effectually preserve the 2000 tubes laid in Milan from becoming corroded to an extent that might in course of time endanger their insulation, it was decided to protect them with a layer of asphalt. The tubes as they lay in the ditch were scraped free from the attached earth, and a tarred wooden box slipped around them, leaving a space of 4 inches between the tubes and the sides of the box. Into this space was poured an asphalt in a semi-liquid state, and consist-

ing of 2 parts of fine sand to 1 part of tar, forming a durable and perfect protection. Some tinned wrought-iron gas pipes that were laid in Milan 35 years ago, and protected with a layer of similar composition, were dug up a short time ago and the tinned iron surface underneath the asphalt was found as bright as when first laid down.

Turning now to the conductors for the Thomson-Houston arc-light system, in which the use of a high pressure requires a more perfect insulation than in the case of the 110-volts circuits, the four dynamos installed in the Milan station have each a capacity of 30 arc lamps connected in series and generate a normal current of 10 amperes. Each dynamo has an independent circuit and two of the dynamos have only their outgoing wires under ground, the return being through an aerial line, while the other two dynamos have both of their circuits under ground, and in this case the under-ground conductors are, therefore, subjected to the full pressure of the dynamos. The under-ground conductors are all lead-covered and armored cables, with a single No. 8 B.W.B. wire. Two types of conductors have been used, one in which the armoring consists of spirally wound iron wires, and a later type in which (as in the case of the previously described larger cable) the armoring consists of two spiral iron bands wound in opposite directions, the outside diameter of the cable being about 1 inch. Although these cables have been in continual use for two years subject to a pressure of 1500 volts, no decrease of their insulation resistance has been observed and no difficulties of any kind have ever been encountered in their use. They were furnished in lengths of 300 m. and had an insulation resistance of about 1200–1500 megohms per kilometer, which, after laying down with joints and connections, became reduced to about 600 megohms per kilometer. At this point it has remained. In especially exposed places the cables are laid into tarred wooden troughs and the space around the cable filled in with cement.

The introduction of the alternate current transformer system called up new requirements, and to meet them we have the double conductor concentric cable. The Zipernowsky-Deri system is used in Milan for the lighting of two theaters that are too far from the station to be economically reached by the network of the Edison system. These theaters are situated respectively at 1200 and 1800 m. from the central station. The concentric cable conveys the 200-volt primary current from the station to the theater, where it is transformed into a 110-volt current supplying Edison incandescent lamps. In general construction and protective armor the concentric cable is similar to those already described, with the exception that it has two conductors placed concentrically. The internal conductor is a single wire of 6 mm. (No. 4 B.W.G.) diameter, and the outer conductor is composed of 44 strands of wire of 0.88 mm. diameter. (No. 20 B.W.G.), with a heavy hemp insulation separating the two circuits. At a point 1000 m. from the station, the cable divides into two branches, one of 260 m. and the other of 600 m., making a total length of 1800 m.

Chamberlain, Wheeler & Co., of Columbus, Ohio, have been appointed sole sale agents for the Sheffield and Birmingham Coal, Iron and Railway Company's plant at Sheffield, Ala., which has just been completed. Within a few weeks the three furnaces will be in blast. The estimated aggregate capacity will be 420 gross tons daily. The company will use brown hematite ores exclusively, a fact which gives promise of a high quality of product.

The Sheet-Iron Manufacturers' Meeting.

A special meeting of the Sheet Iron and Sheet Steel Manufacturers' Association was held in Pittsburgh on Wednesday, the 11th inst. N. E. Whittaker, of Wheeling, W. Va., was chairman, and W. C. Crone-myer, of Pittsburgh, acted as secretary. About 15 firms were represented. The object of the meeting was to discuss the proposed reduction in the tariff on sheet iron and sheet steel. It was decided to send Mr. John Jarrett to Washington to protest against the bill at the meeting of the Senate Committee on Finance, which took up the bill on Thursday, the 12th inst. A member of the association made the following statement after the close of the meeting as to the action taken and the present condition of the trade: "The low price of sheet iron at present is directly due to the low tariff on the English product. The Mills bill will reduce it even lower, until we are driven out of the business altogether. For the past year or two people in the East could import English sheet steel and get it cheaper than they could from Pittsburgh. The present tariff schedule does not cover sheets of soft steel, and the consumers, taking advantage of the present laws, import soft sheet iron, on which they pay but an ad valorem duty. This places the Pittsburgh manufacturer at a disadvantage in favor of the Englishman.

"It was at first proposed to reduce wages to make up the deficiency until the tariff laws could be amended, but as we see the men will not accept a reduction we must do something to save ourselves. A number of manufacturers, instead of making their own sheets, find it more profitable to import those of English make. The difference between the wages paid in this country and England for the same work is from \$6 to \$8 per ton."

Joseph Wharton on Nickel.

The following letter from Mr. Joseph Wharton, the only producer of nickel in the United States, is published in *Lock and Bell*, of New York:

You call my attention to Mr. E. P. Wheeler's remarks concerning my nickel business, and to the Meriden Britannia Company's reply, as published in your paper, and you ask for my comments. I know nothing about this Mr. Wheeler or his affairs. He is obviously no less ignorant about me and my affairs. Mr. Wheeler assumes that I have grown rich by reason of a bounty paid to me in the guise of an import duty on foreign nickel, virtually a tax, as free traders delight to call such an import duty, drawn from my helpless fellow-citizens by the Government for my benefit. He grieves that the Meriden Company were so oppressed by this tax as to be forced to build a factory in Canada, and he thinks that "if Congress had passed a law making him (me) Duke of Lancaster, and giving him (me) a pension of \$20,000 a year," it would have done, except in name, just what it has done. Mr. Wheeler's untruth about the Meriden Company having been demolished by that company I turn to his other points. Is it then true that I am an incubus on my countrymen, idly sucking their subsistence by means of a vicious tax for my pampered sustenance? No! It is not true. It is a lie. In the year 1862, after having established in this country the manufacture of spelter or metallic zinc, I was informed that the United States Mint was unable to procure nickel for making one-cent coins, since the American attempts to produce that metal had broken down, and in no foreign country could an adequate supply be purchased. Inquiry

at the Mint confirmed this: the coinage of cents was really suspended for that cause.

I purchased the remains of the disused nickel works in Camden, N. J., and the Gap nickel mine in Lancaster County, Pa., which was then idle and full of water. These I put in order and wrestled for seven years with the inherent and the artificial difficulties of the business, at the end of that time having what was probably the completest nickel establishment in the world, though it has as yet yielded but little profit. In that interval my factory in Camden had been burned down and rebuilt, with great improvements; the Government had abandoned coining nickel alloy cents, but had afterward adopted, first a 3-cent coin and later a 5-cent coin of a richer nickel alloy; the foreigners who, before I started, could not satisfy either our mint or our private bureaus, had been my fierce competitors for the custom of both; the price of nickel had averaged about 4s. 6d. per pound in England, and about \$1.25 per pound here; the import duty, which was 10 per cent. in 1863, had increased in 1866 to 15 per cent., the latter being about one-third the average rate of duty on all other dutiable imported goods. The pampering of the wicked nickel-maker had not yet begun. In 1870 the duty on nickel was raised to 30 cents per pound, in 1872 it was reduced to 27 cents and in 1874 it was restored to 30 cents—about one-half the rate of duty on other metals. The business now yielded a moderate profit, the customers were well satisfied and my wickedness was not yet apparent, except to some disappointed foreigners.

In 1873 the German Government decided to adopt nickel alloy for certain of its coins, and thereby created a demand for nickel which absolutely stopped all shipments to this country from Europe and carried large quantities of my nickel to Europe. The price there ran up to the unprecedented figure of 16 shillings per pound for a time, equal to nearly \$4 per pound, and for several years averaged about 12 shillings or \$3 per pound. American nickel buyers had absolutely no resource but my works, but I kept them fully supplied at prices as low as those of Europe, not including import duty, and was kindly informed by one of my old English competitors that I sold needlessly low. My profits during those years were, of course, large, but it is hard to see how Mr. Wheeler could have prevented them. Then came a great decline, caused by the cessation of German coinage and by large shipments of rich nickel ores from the lately opened mines of New Caledonia. Year after year the price fell, and one after another the nickel mines and works of Europe succumbed to the constant pressure of the lower and lower prices established by the great nickel monopolist of the world, the French company, Le Nickel, which owns the great mines of New Caledonia. The price in Europe is now about 2 shillings a pound, and here about 60 cents a pound. No nickel mine and only two or three nickel works in Europe have survived the attacks of Le Nickel. In this country I am alone and Mr. Wheeler will kill me if he can have his way.

A marked feature of the early years of this incessant fall was the urgency with which the foreigners shoved their nickel into this country, and the amiable willingness of Secretary Folger to connive at their cheating the customs. The duty on nickel being 30 cents per pound, and that on alloy of nickel with copper (meaning a half-and-half alloy which had been in vogue) being 20 cents per pound, foreign nickel makers experimented on the complaisance of our Government by increasing the proportion of nickel in such alloy until they

had raised it to 95 per cent. (as high as commercially pure nickel when the law was made), and all this was for years admitted by Mr. Folger at the low rate of 20 cents per pound. Surely Mr. Wheeler should find some consolation in this happy device of his friends. Next, after some years of depression, came the Tariff Commission of 1882. Congress then, not following the recommendation of that commission, but acting upon it with an intelligence akin to that of Mr. Wheeler, set upon pure refined nickel the duty of 15 cents per pound, and upon a pound of nickel in matte or in ore the same duty of 15 cents per pound, and so the law now stands.

This charming arrangement, which shuts out all nickel material, while admitting refined nickel, the most difficult of metals to produce, at an inadequate rate equaling about 30 per cent. ad valorem, is mad enough, one would think, to satisfy any free trader who is not unusually dyspeptic. Yet it is against this that Mr. Wheeler pipes his little complaint. Under it more than two-thirds of the nickel used here is imported, and my works pay no profit, not even any interest or rent on capital or plant. The effect of my persistence in running the works which Mr. Wheeler would like to close is that foreigners sell their nickel here at less than their home price plus our duty, hoping to break down my works and then recoup by higher prices. Here is no wicked pampering of a lazy monopolist, and I submit that the free trader who demands yet more for his foreign friends is almost too good a Mugwump to live in this sad world. I have refused to notice the variegated nonsense that has from time to time appeared in print about my nickel business, but it is perhaps my duty to put a stop to it. It is men of my kind, and not of Mr. Wheeler's kind, who make this country something for its citizens to be proud of, and for the people of other countries to respect.

New Guns.—Some recent firings at Sandy Hook with the army 12-inch breech-loading steel mortar for long range tests have given highly satisfactory results. With a charge of 80 pounds of powder and a 630 pounds shell a range of 6 miles and 135 yards was obtained. The two 8-inch breech-loading steel guns built by the West Point Foundry for the Chicago have been completed and shipped to the proving grounds at Annapolis for test. The 10-inch steel breech-loading rifled gun designed for the iron-clad Miantonomoh, and the first steel gun of this caliber completed by the navy, has been finally adjusted upon its hydraulic carriage at the Annapolis Proving Grounds, and fired to test the working of the carriage and breech mechanism. These worked easily and accurately, and the gun is now in a condition to carry on experiments for determining the proper grade of powder with which to conduct the statutory tests.

In 1878 the six great French railway companies were working between them 11,700 miles of line. At the close of 1887 the corresponding total had risen to 18,045 miles. This latter total was made up as follows: Paris, Lyons and Mediterranean, 4970 miles; Orleans, 3703 miles; Western of France, 2805 miles; Eastern of France, 2718 miles; Northern of France, 2157 miles, and Southern of France 1692 miles.

The Lowell Machine Company, of Lowell, Mass., were incorporated in 1845, and their capital stock is \$900,000. They employ 1400 men; their weekly pay-roll amounts to \$11,000; the territory covered by their shops and boarding houses embraces nearly 13 acres, and they have the capacity to turn out the machinery for a mill of 40,000 spindles in three months.

A Trip to Lebanon, Pa.

Last Thursday a small party, gathered at Philadelphia in a special car to visit two manufacturing establishments in the Lebanon Valley, with the chief object of affording Messrs. Watson and Mueller, engineers of Mr. Claus Spreckles, the sugar king of the Pacific Coast, an opportunity to satisfy themselves that one of the concerns possesses the facilities to carry out contracts since entered into for supplying the ironwork for the great sugar refinery now being built in Philadelphia. Besides the gentlemen named the party consisted of Frank Dundore and James Meily, of F. Dundore & Co., Philadelphia; L. M. Moyes, of the Babcock & Wilcox Company; Adam B. Rork, who has the contract for part of the work of building the refinery, and Charles Deacon, a well-known Philadelphia journalist, the representative of *The Iron Age* being the eighth member of the party. Early on Friday Conewago Junction, on the Pennsylvania Railroad, was reached, the special car being taken to Lebanon over the Cornwall and Lebanon Railroad, one of the most thoroughly built and equipped lines in the country. Comfortably sheltered in the Lebanon station of the road, a little gem architecturally, the party partook of a substantial morning meal after having made a preliminary reconnaissance of the works of

THE LEBANON MFG. COMPANY,

a concern which has developed from modest beginnings nearly a generation ago to a well-equipped plant, employing between 300 and 400 men, having a capital now of about \$237,000. For years the company have made a specialty of steam engines, blowing engines, furnace ironwork, general machinery, and of late years have added the building of cars to their lines. Among the contracts lately filled were six blowing engines for furnaces at Sheffield, Ala., built by Gordon, Strobel & Laureau, the last of the six having been shipped about two weeks since. The foundry, a brick building of 60 x 195 feet, contains one 54-inch Colliat cupola, and one 40-inch ordinary cupola, two spacious core ovens, the whole floor space being commanded by a 20-ton Niles overhead traveling crane of the latest design. The machine-shop, 60 x 198 feet, besides a large variety of smaller tools, contains a 6 x 7, 28-foot Putnam planer, a Niles boring mill, 14-foot swing and 10 feet high, a 96-inch Niles locomotive wheel lathe, and a 58-inch Niles radial drill. The smith shop is 50 x 125 feet, and there are, besides, car works with the necessary wood-working machinery, a setting up shop, paint shop, storehouses, &c. The officers of the company are A. Reinohl, president; R. Meily, vice-president; J. M. Gettel, superintendent, and J. Hunsicker, treasurer, the agents being Frank Dundore & Co., of Philadelphia. It is in this establishment that the cast-iron work for the Spreckles' refinery is to be made, the contract for the first block of 2300 tons, including beams, &c., having been awarded to Dundore & Co. It is estimated that the entire structure, will call for 13,000 to 14,000 tons of cast and wrought iron, the capacity of the refinery aimed at being 1000 tons of sugar per day.

Taking the car over the tracks of the Lebanon and Tremont Railroad, the party was carried past the old town of Jonestown, once a busy place on the long-abandoned Union Canal, to Lickdale, where the works of

THE LICKDALE IRON COMPANY

were inspected. On the site of an old forge, parts of which are still standing, this company have built a Clapp-Griffiths plant, after the well-known design of Mr.

James P. Witherow, of Pittsburgh. It consists of two 3-ton converters, one of which was blowing at the time of the visit, the most interesting feature in connection with the operation being the copious flow of cinder from the cinder notch during the blow, and the fact that mountain limestone is used to make the bottom. The mixture used, in connection with which there are some interesting points, appears to make a hot blow, and allow of considerable additions of scrap. The works have a Lewis two-high blooming train, driven by a Tod Porter-Hamilton engine, and served by a Smith gas heating furnace. The location, however, does not appear to be favorable, situated as it is on an unimportant branch road. Last year the company made a round lot of higher carbon steel for rail blooms, but the conviction has been reached that the proper sphere for the plant lies in mild steel, and attention is now being given particularly to slabs and billets for rails, plates, sheets and structural shapes. Col. J. N. Lick, a relative of the famous James Lick of Pacific-Coast fame, is president and C. P. Sherk is superintendent, Frank Dundore & Co. being selling agents.

Returning to Lebanon a visit was paid by a few of the party to the Weimer Machine Works, too hasty, however, to do justice to the magnitude of its operations or the many interesting special points noted. In the erecting shop was a very large blowing engine, just being completed for the Warwick Iron Company, and a smaller blowing engine, one of a dozen, built or building, for the Ensley plant of the Tennessee Coal, Iron and Railroad Company.

Returning to the special car, the latter was found to be decorated with flags and devices expressive of the sentiment "Protection to American Industries," which met with expressions of approval from the men employed at the mills and furnaces passed during the rest of the journey. After a very brief visit to the Colebrook furnaces, probably the most lavishly equipped plant in the United States, the party was carried to the famous Cornwall ore banks. Drawn up over the great spiral track to near the summit of the big hill the party ascended to the top to find spread below the fertile Lebanon Valley, with 11 furnaces, all in active operation, within sight, all of them drawing their supplies from the wonderful deposit lying at their feet. During the last six months these furnaces clustered around Lebanon made 119,000 gross tons of pig iron.

Magnificent though the mineral properties of this country may be, none thus far discovered outside of the exhausted Comstock lode approaches in past record or in present or prospective value that of the Cornwall ore banks. The Calumet and Hecla, with its great record of dividends, the Ontario, of Utah, the best paying silver mine in the Rocky Mountains, the Homestake, the great gold mine of the Black Hills, Dakota, the Vermillion mines, of Minnesota, the Colby, of the Gogebic range, and the famous properties of the Marquette and Menominee regions, the enormous magnetite deposits of Lake Champlain, and the far-famed Iron Mountain, of Missouri, are all eclipsed by this Pennsylvania accumulation of iron ore. It has been repeatedly described in detail, the most elaborate, scientific and historical monograph on it having been published a few years since by D'Inwilliers, of the Second Geographical Survey of Pennsylvania. Yet few outside of a comparatively narrow circle realize how enormous must be the revenue drawn from it, and what are the vast possibilities for the future.

The cost of putting the ore on cars is 20 cents a ton. As it carries considerable sulphur it must be roasted, which is usually estimated to cost 40 cents

a ton, the kilns being at the furnaces. Adding as a liberal figure 15 cents a ton for transportation to the furnaces in the immediate vicinity of Lebanon, a total cost is reached of 75 cents a ton, roasted, at the furnace. The ore, however, is sold to the furnaces, the majority of which are controlled by parties holding an interest in the ore banks, on a sliding scale based on the monthly average price realized for No. 3 pig iron. In the case of the latter, an important part of it is again based on the price of rails at the consumer's mill. Taking the ore at cost and coke at \$3.50 per gross ton, the cost of production of pig iron must be under \$10 a ton, while the selling price even now averages probably slightly above \$14. Of course the furnace companies as such do not earn such profits, but it is probably within the bounds of the truth when we state that the owners of the ore banks realize fully \$2 a ton, if not more, on every ton quarried. In 1887 the output was 667,210 gross tons, and in 1886 it reached 688,054 gross tons. When it is considered that generations will not exhaust the deposit at the present rate of extraction, some idea may be obtained of the royal income derived from the property by its possessors.

The concern is divided into 96 shares, of which Robert Coleman owns over 30, the balance being cut up into comparatively small holdings. Conversing on one of the latter a gentleman who is very familiar with the property was asked what he believed two shares would fetch if thrown on the market. After some hesitation, and prefacing it with the remark that it depended largely upon the condition of the trade and other circumstances, he expressed the opinion that it would probably not be a difficult matter to get \$500,000 for one forty-eighth interest in the property. The possession of a claim upon the profits realized certainly seems to create some indifference to values if there is any foundation in an anecdote related. One of the fortunate owners of a few shares in the Cornwall mills has a residence in one of the leading cities of the United States. Adjoining it there is a large hotel, whose proprietor, encouraged by success, believed that it would be a good investment to purchase the adjoining property for the sake of enlarging his facilities for entertaining guests. A suggestion on his part that the owner of the residence name his price was met with the startling answer: "What will you sell your hotel for? I have long been thinking of enlarging my lawn."

The view into the charming valley of Lebanon was a fitting climax to the trip to one of the most favored sections of the country, the home voyage being promptly begun.

Among the retail hardware concerns at present doing business at Quincy, Ill., is that of the Cottrell Hardware Company, located at No. 124 North Fifth street. The company occupy the entire structure, which is five stories in height, and carry in stock a full assortment of general hardware, tin plate, agricultural implements, vapor stoves, woodenware, &c. The first floor of the building is devoted to the retail department, in the rear of which is the shipping department, which in turn adjoins the counting-room. One of the rules of this house is that all orders shall be shipped by the evening trains on the day they are received, something that is generally appreciated by the customers. The second floor of the building is occupied by the sample room. The third and fourth floors and the basement are devoted to the storage of goods. The company keep four salesmen on the road, who visit their friends in the trade once every month.

THE WEEK.

The New York and New Haven Railroad Company have completed arrangements for connection and a traffic agreement with the Poughkeepsie Bridge Company, and has signed a contract for 50 years. This will give the Delaware and Hudson, and the Erie direct connection for coal traffic with the New England States, and will also let the West Shore Railroad in for a short route direct to points east.

The Mexican Pacific Railroad about to be commenced will extend from Mazatlan to the Colorado River in Southwestern Arizona and will be one of the most important lines of railroad in Mexico, making a continuous line of 1400 miles. It is stated that when the concession was first secured it was the intention to obtain the aid of English capital in building the road, but when the promoters arrived in New York, they found an abundance of American capital at their disposal, and the road will be built and owned entirely by Americans.

Chief Engineer Church in his testimony before the Senate Investigating Committee last week to some extent approved of certain departures from the specifications which were made by the aqueduct contractors in the execution of their work. He said that practically the aqueduct is a tunnel all the way through, for the cuts were so deep that when filled in they were "practically tunnels," justified the use of the rubble masonry in place of dry filling. He had a sad example before him in the dilapidated old aqueduct. The question of dry filling or rubble masonry was not of much importance in a railroad tunnel, but of the greatest importance in an aqueduct, which was to last, not alone, for 20, 50 or 100 years, but for all time. In case of a break it would be impossible to carry on extensive repairs, and in a short time the city would be left without water. At any point a difference of 18 inches would upset the balance of pressure. The question had to be decided by the chief engineer alone, because he only had the data all along the line. When his assistants gave their views before the committee, no matter how well equipped they might be as engineers, they could not speak authoritatively on the matter in dispute because they had not all the data in their possession. Two years ago he himself had not that data.

English encroachments in Spanish America are the theme of a correspondent in Merida, Yucatan. The principal lines of railway are passing into her possession, and other schemes are in contemplation with a view to obtaining control, so it is alleged, of the entire transportation interests of that country. And now, says the writer, the Mexican Government has contracted with an English firm for the completion of that long-talked-of Tehuantepec Railroad, which when completed will furnish a shorter cut across the continent than either the Nicaraguan or Panama schemes. The road in question at various times has been a pet project with several parties in the United States, the last of whom, Edward Larned, of Pittsfield, Mass., made considerable progress in the work of construction. It now remains to be seen what the English corporations will accomplish. The line—whose entire length is about 200 miles, two-thirds of which is partially completed—runs from the bay to Coatzacoalcos, on the Gulf of Mexico, due south, to Salina Cruz, on the Pacific Ocean, traversing the southern portion of the States of Vera Cruz and Oaxaca. The Rio Coatzacoalcos is navigable for about 80 miles, and at low tide the depth of water on its bar is 18 feet. The immediate section produces cotton, sugar-cane, to-

bacco corn, coffee, cocoa, vanilla, sarsaparilla, ginger, indigo and india-rubber. Salina Cruz, the Pacific terminus, is said to have an exceptionally fine harbor. The English contractors (Col. Edward MacMardo, represented in London by Lord Archibald Gosford) are to receive \$10,000,000 in 5 per cent. bonds, secured by a first mortgage on the entire property.

The trestle bridge near Orange Court House, Va., broke down under the weight of a passenger train, and eight persons were instantly killed. Many others were wounded. The trestle was 48 feet high, and known to be weak.

Corean progress is uninterrupted, no political disturbances having occurred. The Legation at Washington city will soon be fully re-established and consulates be opened in New York and Philadelphia, American gentlemen filling the positions. The Corean telegraph and cable line has been completed to Japan by way of Fusan, and active steps are being taken looking toward the developing of the rich natural resources of the country. Advices are also received to the effect that Judge O. N. Denny, ex-United States Consul General to China, has been reappointed Governmental Adviser for a further period of two years.

An electric street railway, the first of its kind in Massachusetts, was opened for business last week, at Crescent Beach. The line is $1\frac{1}{4}$ miles in length, a branch of the Lynn and Boston railway. Like the electric road at Ansonia, Conn., the electric current is taken from a wire running above the track, the return current being conveyed through the rails of the track, which are connected by wire for that purpose.

Secretary Whitney and Secretary Endicott have each asked Congress for the appointment of an Assistant Secretary, on the ground that the efficiency of their respective departments will be greatly increased thereby. Construction to the extent of scores of millions of dollars is going on or is in contemplation for the purpose of replacing the old fleet by a new one. This work will probably last through the remainder of the century at least. Coupled with it is necessity for providing heavy guns for the new vessels. Respecting the war office in addition to the ordinary considerations, it must be remembered that it is now proposed to enter upon a most important system of coast and harbor defense, which may require the expenditure, first and last, of more than \$100,000,000 for forts, guns and auxiliary means of protection. This will necessarily impose new labors upon the War Department.

The new theater building on the site of Irving Hall will be absolutely fire-proof, with a domed roof richly ornamented with ironwork, and the interior will be fitted with an iron drop curtain.

The latest shipment of "canned goods" from this city to San Francisco comprises 16 tin cases containing the bones of dead Chinamen being returned for burial.

Work on the Croton Aqueduct thus far is said to have cost \$19,000,000, or more than double the estimates, and it is intimated that for this reason and the close relations between the commissioners and the contractors a reconstruction of the commission is probable.

There is a marked decrease in the number of buildings for which plans have been filed this year in New York City. The records at the Bureau of Inspection of Buildings show that the cost of the buildings in these plans for the quarter ending with March was \$9,480,491, and for the quarter ending with June was \$15,897,204, making a total for the six months of \$25,357,695. This is a remarkable decrease from

former years. The total for the first quarter in 1886 was \$17,088,643, and for the same period in 1887 it was \$17,254,865.

Chicago is promised a prosperous year in the building trades. The report of the local building department shows that up to July 1, 1888, the number of permits issued was 2156; value of buildings constructed, \$11,131,000, an increase of \$1,423,828 compared with 1887.

An important new departure in the use of natural gas is announced in Pittsburgh. The Philadelphia company are preparing to put in meters. The fuel has been used extravagantly, simply because it does not cost the consumer any more than the fixed annual rate. Some of the meters for the iron and steel mills will have a regulating capacity of 1,500,000 cubic feet.

Consul-General Raine, in a report to the State Department, says that Professor Serling, a distinguished German authority, in a work recently published, reviews with much care the condition of agriculture in the United States, and comes to the conclusion that, notwithstanding contrary arguments and the greater difficulties at present encountered in America (and he criticises severely our land policy and the acquirement of great tracts of land by capitalists and railroad companies), American competition, after all, must be looked upon as controlling the grain market of the world. The professor states that it is true that the competition of America, as far as Germany is concerned, has become more and more significant.

A Berlin correspondent of the *Indianapolis News* says that meat in that city is 100 per cent. dearer than it is here. He continues: "Although, as a rule, wages here are very low, taken from an American standpoint, living is really higher than in America, especially so in Berlin. Rents are very high, and people live very much crowded, and if it were not for the very strict enforcement of sanitary laws it would necessarily be one of the most unhealthy cities in Europe, while it is in reality the opposite. Bricklayers are trying hard, by virtue of unions, to maintain a price of 12½ cents per hour. Cabinet-makers and upholsterers average 10 cents per hour. Tailors and shoemakers about the same. Servant girls, who, by virtue of laws governing their particular branch, are almost entirely at the mercy of their mistresses, earn on an average about \$38 per annum. Other occupations in like proportion, from the day laborer to the bank cashier. The only redeeming feature in this unnatural state of affairs is that clothing, shoes and amusements are cheaper than in America."

Hiram Sibley, of Rochester, a native of North Adams, Mass., died July 12, aged 81 years. He early manifested a taste for mechanical pursuits, and has left several permanent memorials of his active life, among others Sibley College of Mechanics and Arts of Cornell University and Sibley Hall, attached to Rochester University. He was the first president of the Western Union Telegraph Company, which office he held 16 years. He was a large promoter of business enterprise.

The Jerome Park site being required by the Aqueduct Commissioners, extensive buildings for the Jockey Club will probably be erected in Westchester at a point equally distant from the city. The plans prepared by Thos. R. Jackson, the architect, contemplate an expenditure of \$300,000, the buildings to be entirely of iron, brick and stone.

The Bureau of Steam Boiler Inspection in New York reports that inspectors had examined 1622 steam boilers carrying over 10 pounds pressure, during the second quarter of the year, had tested 1365 and found 101 defective; 26 boilers were con-

demned as unfit for further use. There were 1629 applicants who were examined for engineers' certificates: 1492 stood the test and 137 were rejected. No accidents or explosions occurred during the quarter, a rare occurrence in this city.

An electric system, by which the movement of railway trains while at full speed is automatically regulated, has been introduced successfully on the West Shore line. Briefly told, the system consists in an apparatus adjusted to the rails on either side of the track, and is composed of two springs, which, as they are pressed down by the weight of a passing train, cause a red "banner" in the guise of a semaphore to be exhibited, and this signal stands at "danger" until every wheel has passed out of the block which it entered. At the same time the apparatus registers in the train-dispatcher's office the number of wheels that have gone in and out of the block. The failing of a single wheel to emerge from the block is thus at once signaled, as would happen in the case of a train parting in twain. It is claimed that at the Weehawken tunnel the cost of working this apparatus is but \$75, as against \$3000, the cost of the system formerly in use.

Several years ago a number of German workmen went to Connecticut by a preconcerted arrangement and obtained employment in the clock factories in New Haven, Ansonia, Waterbury, Thomaston and Winsted. They worked steadily for a long time, applied themselves diligently to mastering the science of clock-making and became proficient in the art of handling fine tools. They also purchased tools and several of the complicated machines, and, returning to Germany, they began the manufacture of clocks for themselves. They set up a factory in the Black Forest region, and their business now amounts, according to letters recently received, to nearly 50,000 clocks a month. This German factory has proved a close competitor with the Connecticut concerns in the foreign markets.

The vast stride made by New York City during the past century can be seen by comparing the contents of the first volume of the City Directory with those of the one for 1888-89, just issued. The volume of 1786 contained the names of 846 residents, and that of 1888 contains the names of 835,228 residents. In the former year the population of the city was 23,614, whereas to-day it is estimated that the resident population is fully 1,076,140. The floating population is calculated at 400,000, and a close observer reckons that on each day of the year there are about 2,000,000 persons within the limits of Manhattan Island.

The President having signed the bill creating a Department of Labor, the act has gone into operation. The Commissioner of Labor will now report directly to the President and not to the Secretary of the Interior. No increase in the number of employees is made, and Carroll D. Wright continues to be commissioner.

The President has approved the bill providing for the appointment of commissioners to represent the United States at an international maritime conference, which is to devise ways and means better to secure life and property at sea. The President has accepted the resignation of the Hon. George V. N. Lathrop, United States Minister to Russia, to take effect August 1. Mr. Lathrop is not in good health.

The stupendous plan for supplying the city of Liverpool with water involves the removal of a whole Welsh village, including woods, cottages, churches, &c., this immense space to be devoted to a reservoir $4\frac{1}{2}$ miles long by $\frac{1}{2}$ mile to 1 mile broad

and 80 feet deep. There are to be three lines of pipe, each 68 miles long, with filtering beds and secondary reservoirs, and the cost of the aqueduct alone is estimated at \$15,000,000.

The United States Grand Jury at Springfield, Ill., have indicted the St. Louis, Alton and Terre Haute Railroad Company (Canso Short Line) for violating the postal laws by carrying irregular mails and letters for the Consolidated Coal Company.

The Congressional bill passed by the House for the erection of an appraiser's warehouse in New York City increased the amount of appropriation from \$1,500,000 to \$3,000,000.

Sunset Cox, speaking of the next decennial census, estimates the population of 1890 at near 64,000,000.

Two bids were received at the Navy Department for machine finishing and constructing steel breech-loading rifles for the cruisers Baltimore and Charleston. They were from the West Point Foundry Company and South Boston Iron Works, and were exactly the same—that is, \$3800 for one and \$40,800 for 12.

Whitelaw Reid's newly furnished mansion, erected by Ben Halliday, and lately known as part of John Roach's estate or Ophir Farm, was burned on Saturday, as supposed in consequence of a defective flue. Loss \$500,000.

Report says Commander Folger, U. S. N., will have charge of the new Washington ordnance foundry, and that he will make a tour of all the large ordnance works in Europe before entering upon the local duties of the office. He will be associated with a civilian expert.

The stock of pig iron in Connal & Co.'s Glasgow stores at the beginning of July exceeded 1,000,000 tons, an amount never before reached or considered possible. Not a few in the trade are disposed to look on the accumulation as a wholesome indication, operating as a sort of governor by relieving the market of a surplus at one time and checking speculation at another.

A boudoir on the roof of the Equitable Building, 200 feet above the ground, for the occupancy of President Hyde, will be reached by a flight of gilded iron stairs, and be inclosed in a gilded network of iron, the whole superbly furnished.

The membership of the Knights of Labor, according to statements purporting to come from official headquarters, has dwindled from 729,000 in July, 1886, to 348,672 at the present time.

Icelanders to the number of several thousand are flocking into Manitoba, refugees from intolerable winters and consequent poverty and starvation.

The election of Dr. Juan Pablo to the presidential chair in Venezuela is construed as an omen favorable to closer relations with the United States.

Miss Garrett, the daughter of the Baltimore millionaire, practically directs the management of a property valued at \$20,000,000, and for many years before the death of John W. Garrett was regarded as a sagacious adviser.

The New York State Attorney-General, it is reported, will be invoked to annul the charter of the United States Illuminating Company, who are in opposition to the Board of Electrical Control. According to one statement, supposed to emanate from the telegraph companies, a "deal" was made, whereby the present conduit, which consists of iron pipes, was to be foisted upon the city in the guise of a system properly constructed for receiving the wires. The Subway Company for some reason prevailed upon the commission to

adopt this pipe system, although the commission had decided upon an asphalt concrete system because its engineers had previously reported that asphalt would be less objectionable than iron, and therefore doomed to failure. The charge is made that the Metropolitan Telephone Company have sought to create a monopoly of all electrical service in this city through the means indicated.

The Canadian Pacific Railroad is gradually establishing itself among the recognized great channels of traffic, and is not only overcoming obstacles that arise, but taking a position among Northern railroads, where it may assume an aggressive attitude. The latest achievement is to secure by purchase a controlling interest in the Duluth, South Shore and Atlantic Railroad, thereby obtaining possession of an American and Canadian systems of no less than 6500 miles. The road is expected to take a larger share of local business from Lake Michigan ports. Still another advance step is the building of the Sault Ste. Marie and Southwestern road, for which, according to a Montreal dispatch, funds have been secured. It is intended to construct the link between the Union Pacific and the Canadian Pacific railways, giving the former, by a traffic combination now being arranged, a line eastward to tidewater from the Missouri River 250 miles shorter than any now operated, and giving the Canadian Pacific entrance into territory southwest of its present system in Manitoba and Ontario.

Cleveland papers bring accounts of an alleged mammoth syndicate, well supplied with English capital, who propose to build a fleet of ore steamers and monopolize the trade of the Lakes in that department of enterprise, but the scheme does not appear to have a substantial foundation.

Consul Cabro, representing the Argentine Republic in New York, speaks of the rapid increase of the carrying trade between the two countries. The Republic, he says, look to the United States for almost everything that is wanted. All kinds of machinery and agricultural implements come from this country, being cheaper and of a superior quality, but in the absence of direct steam communication it was found necessary to contract for shipments via Liverpool and London.

Claus Spreckles is reported from San Francisco to have scored a point with the sugar trust in his first onset by buying 50,000 tons of raw sugar, cornering the market, and realizing \$40 per ton or \$2,000,000 profit from the transaction.

The Manhattan Athletic Club intend to erect an elegant club house on Madison avenue and Forty-fifth street, to cost \$300,000 exclusive of the land. It will be 125 feet square.

The Senate proposes to add \$800,000 to the post office appropriation bill for the encouragement of American steamship transportation, but the House is strongly opposed. Foreign lines volunteer to perform the service for less money, but a nursery of American seamen is desirable, as a provision against future trouble.

At the annual meeting of the Rome Merchant Iron Mill, Rome, N. Y., the officers elected for the ensuing year were Jim Stevens, president, Wm. Stevens, vice-president, Chas. W. Lee, secretary and treasurer, Samuel Southall, superintendent, and Jay Hildrith, agent. The company have steadily enlarged their works during the past year, having lately built three additional double puddling furnaces, which, with other improvements, have materially added to their capacity. They are running full in all departments and are well supplied with orders.

MANUFACTURING.

Iron and Steel.

The Pittsburgh Forge and Iron Company, of Pittsburgh, whose works are located in Allegheny City, are attempting to run the forge department of their mill with non-union men. Some time ago the firm proposed a reduction of 10 per cent. to all employees not members of the Amalgamated Association. The men refused to accept the reduction and the works were closed down. It is stated that more than half the old employees are at work, having accepted the reduction. The resumption of work does not affect the Amalgamated Association. Nothing will be done about their scale for the present. James K. Verner, secretary of the company, has made the following statement as to their future intentions: "We have started the forge and mean to run it. We will run it at the reduction or not at all. We will not sign the Amalgamated scale. After we get things in first-class working order with the other we will turn our attention to them."

The nail factory of the Wheeling Iron and Nail Company, at Wheeling, W. Va., has been closed down for an indefinite period. The blast furnace of this company was also blown out on the 1st inst. for the purpose of being relined and repaired. It has made an excellent record, having been in blast continuously since November, 1885, on one lining. It will resume operations again about October next.

The Laughlin Nail Company, of Wheeling, W. Va., whose extensive works are located at Martin's Ferry, Ohio, are endeavoring to complete their usual summer repairs with the view of resuming operations at the earliest moment possible. This company are enjoying an unusually brisk trade this year, and are disposing of their product as fast as it is made. Their factory contains 192 nail machines, and for the past six months their output was over 180,000 kegs, while their shipments for the same period amounted to 190,000 kegs.

Furnace No. 1 of the Stewart Iron Company, Limited, at Sharon, Pa., was blown out Tuesday, the 10th inst., owing to the unsatisfactory condition of the iron market. The company have a very large stock of pig iron on hand with very little demand for it. The furnace will remain idle until there is a decided improvement in the business situation.

The Ensign Mfg. Company, Huntington, W. Va., have received an order from the Baltimore and Ohio Railroad Company for a large number of car wheels for their road, to be delivered in installments of 2000 per month.

The Cartersville Iron Furnace Company, of Cartersville, Ga., have been chartered by John Postell, D. W. R. Peacock, Geo. A. Patillo and others, with a capital of \$25,000.

The Eliza Iron Company, of Wellston, Ohio, operating the Eliza furnace under lease, will put the furnace out of blast in the course of two or three months and will retire from business, on account of the depression in the iron trade. The company state that the cost of manufacture of pig iron at present is over and above the price obtained for it, which is the reason for the above step. Wellston Furnace, also located at Wellston and operated under lease by King, Gilbert & Warner, of Columbus, Ohio, was blown out on Saturday, the 7th inst., for an indefinite period. Milton Furnace, owned and operated by the Milton Furnace and Coal Company, at Wellston, will also be blown out at an

early date. The above-named furnaces, three in number, comprise all the blast furnaces located at Wellston, and in a short time they will all be idle.

The Peerless Mfg. Company, of Louisville, Ky., have issued a catalogue consisting of some 25 plates, presenting a great variety of artistic iron linings and portable basket grates. The designs are very handsome, and give evidence of great care in their execution.

The plant of the National Tube Works Company, at McKeesport, Pa., resumed operations on Thursday the 12th inst., after an idleness of about ten days for repairs.

The Granite Iron Rolling Mills of the St. Louis Stamping Company are undergoing repairs, which will be completed in about three weeks. No exchange of views with employees of the mills looking to a resumption of operations under any scale of wages has been had.

The creditors of Graff, Bennett & Co., of Pittsburgh, have made application to Court for the sale of the three iron mills of the firm. The Court ordered the sale of all the property on 20 days' notice. The mill properties of Graff, Bennett & Co., are among the most valuable in Pittsburgh. One is located on the South Side, and the other at Bennett Station, on the West Penn. Railroad. They also owned the Clinton furnace in Pittsburgh, and were interested in the Grafton furnace at Leetonia, Ohio.

The St. Louis Sheet Steel and Iron Post Company, of St. Louis, have filed articles of incorporation, with a capital stock of \$500,000.

Lean & Blair, engineers and contractors, of Pittsburgh, have received a contract from the Union Rolling Mill Company, of Cleveland, Ohio, for the erection of five large heating furnaces and a gas-producing plant complete. These works have heretofore run on coal, but will change to gas.

As reported in our last week's edition, the Laclede Rolling Mills will be closed down for an indefinite period in the early part of this month, the present operators, the Laclede Plate and Sheet Mill Company, not caring to renew their lease, which has already expired.—*Age of Steel*.

At the Philadelphia Bridge Works of Cofrode & Saylor, at Pottstown, Pa., new hours of labor went into effect on Monday the 9th inst., to continue until further notice. Instead of working from 7 until 12 and 1 to 6, the hours will be from 6 to 12 and to 6 five days of the week, and on Saturday commence at 6 and quit at 11 a.m. for the remainder of the day.

The Bethlehem Iron Company have made a proposition to the men that if they are willing to share with the company a reduction in prices which would be covered by a reduction varying from 5 to 20 per cent. in wages in the different departments, the company on their part hope to be able to provide reasonably steady work during the balance of the year. This applies to the steel mill and old rail mill, but not to the puddle mill. The men have accepted the proposition and the works have resumed operations.

Machinery.

Mr. C. E. Torrance has purchased the interest of Messrs. Pattee & Draper in the Holyoke Hydrant and Iron Company, Holyoke, Mass., and will continue the business as heretofore under the name of Holyoke Hydrant and Iron Works, C. E. Torrance, proprietor.

Mr. J. D. Thomas, representing the Westinghouse Machine Company of Pittsburgh, has departed for Rome, Italy. The

object of his visit there is to introduce the Westinghouse system of electric lighting. Some time ago six dynamos, manufactured by that company, were sent to Rome and Turin. These machines will be put in operation by Mr. Thomas, and an electric-lighting plant erected in both the cities named.

The Oil Well Supply Company, Limited, of Oil City, Pa., have just received from the East a large drop hammer, which is believed to be the largest in this country. With this hammer and several of smaller capacity, the company are now prepared to do heavy drop-forged work, and at present are at work on an order from New York parties for drop forgings for a patent car-coupler.

A dispatch from Youngstown, Ohio, under date of the 8th inst., reads as follows: "Work will be commenced to-morrow on the new shops of the New York, Pennsylvania and Ohio Railroad at Brier Hill. The contract for their construction has been awarded to Drake, Shattuc & Co., of Pittsburgh, who also have the contract for the double-tracking of the road from here to Cleveland. The company have bought 36 acres for the shops, and expect to have them ready to be occupied by November 1."

The new twin-screw propeller, Monmouth, from Philadelphia, was entirely successful on her trial trip to Sandy Hook. She is 931 tons burden, with four boilers and improved engines. She cost \$250,000, and it is expected that she will develop a speed of 16 knots an hour. One special feature in the construction of the boat is the adoption of the twin-screw propeller. Her length over all is 270 feet, her width 48 feet and depth 15 feet. The cylinders are 19, 30, and 50 inch diameter by 30 inch stroke of piston, and are expected to develop 2500 indicated horse-power, with a steam pressure of 160 pounds. Piston slide valves on all the cylinders are worked by the Marshall valve gear, the air pumps are driven off side levers and the centrifugal circulating pumps driven by independent engines.

The Howe Scale Works, at Rutland, Vt., were sold at auction the 12th inst., for \$441,283. The sum includes the amount of liabilities, \$201,133, which are assumed by the purchasers. The new owners will take possession within 60 days. Work will go on without interruption.

The Laidlaw & Dunn Company, Cincinnati, Ohio, have been awarded the contract to furnish all the necessary pipes, fittings, valves, heaters, pumps, &c., for the large new works of the Addyston Pipe and Steel Company, now being in course of erection at Addyston, Ohio.

A newly formed company, with ample capital, have purchased Dr. Raub's patent for his central power engine, the first of which was constructed at the Grant Works some two years since, and which, it is claimed, has proven a very great success. It is said that ten of the engines will be built at the Grant Works as soon as the new company are ready to begin operations.—*Paterson (N. J.) Daily Guardian*.

The Curtis Regulator Company, of Boston, Mass., report increasing foreign sales, among which, within the last few weeks, are two damper regulators in England and in Denmark. They have sold, also, 18 steam traps and six pressure regulators; also damper regulator of 200 horse-power for the Congaree Mfg. Company, Columbia, S. C.; a 4-inch steam separator in New York and one 6-inch and an 8-inch steam separator to the Tremont Nail Company, of Boston.

Hardware.

The Columbiana Handle Company, Columbiana, Ohio, who bought out the Leetonia

Tool Company, the first of the year, have built a new shop, 121 feet long and 40 feet wide, which they are now occupying. The works are situated on the main line of the P. F. W. and C. R. R. They report a good trade, domestic and foreign.

The Cincinnati Wire Company, Cincinnati, Ohio, whose factory, as we have already noticed, has been idle for a short time, in order to take inventory and make alterations, have resumed operations and will run it to its full capacity for the balance of the year.

The St. Louis Vise and Tool Company, of St. Louis, have increased their capital stock from \$5300 to \$30,000. Its assets are reported to be \$47,661.78, and liabilities \$15,781.64.

The Freeman Barb Wire Company, of East St. Louis, who employ about 125 men, cut wages about 20 per cent. on the 13th inst., and the result was a strike, and 100 men left the shops. The wages ranged from \$2 to \$3 per day, and there was a cut of 50 cents all around. The company expect to fill the strikers' places.

The Belleville Nail Company, of Belleville, Ill., have notified the Secretary of State of Illinois of an increase in their capital of \$100,000 to \$300,000.

Miscellaneous.

The Pittsburgh Natural Gas Company, of Pittsburgh, have been incorporated, and have already begun work on their line from the gas field at Murrysburg to Pittsburgh. The new company start with a capital stock of \$350,000, and the stock is all held by members of the firms of Park Brothers & Co., Limited, of the Black Diamond Steel Works, Pittsburgh, and William Clark's Son & Co., also of that city. The company own a considerable block of gas territory in the Murrysburg district, and as the two firms mentioned compose the firm they will henceforth furnish their own fuel. The contract for the laying of the pipe has been let to Gwinner & Co., and the work is now in progress. The line will be 19 miles in length. The first 7 miles will be of 12-inch, and the remaining 12 miles of 16-inch pipe. The contract for the 12-inch pipe has been let to Dennis Long & Co., of Louisville, Ky., and the 16-inch pipe is being made by the National Tube Works, at McKeesport. The work will be completed before autumn. It is estimated that the cost to the two firms for fuel under this plan will not be more than one-half what it is at the present time.

It is announced that the Westmoreland Coal Company, of Irwin, Pa., will build a new car shop at that place that will give employment to about 100 men. The firm will build their own cars, which are now made in the East.

Portsmouth, N. H., claims to have the largest shoe manufactory in the world, paying out to their employees \$35,000 every month. They have also an extensive machine shop, employing a large number of skilled mechanics.

The following corporations have been authorized to transact business in Illinois: The F. C. Austin Mfg. Company, of Chicago; capital, \$150,000; for the manufacture of all kinds of road-building, well-building, mill and farm machinery; incorporators, Frederick C. Austin, Elbert H. Cary and Thomas C. Chapman. The Universal Mfg. Company, Chicago; capital, \$12,000; to manufacture heaters and burners of petroleum for cooking purposes; incorporators, J. Howland Silvera, Arnold Brecher, Henry D. Duff and Sumner Stowe Ely. The Goodrich Mfg. Company, of Chicago; capital, \$20,000; to manufacture sewing machine attachments; incorporators, Charles W. Rhodds, Almon W. Bulkley and Edward E. Gray. The Lake Shore

Foundry Company, of Chicago; capital, \$15,000; to conduct a general foundry business; incorporators, P. H. Meehan, R. D. Wardwell and Oscar Ludwig.

The engine house at the Florence iron ore mine, at Florence, Wis., was totally destroyed by fire on the 13th inst. The engine house contained about \$75,000 worth of machinery, including five engines and hoisting drums, four boilers, two compressors, two pumps, &c. The building was valued at \$1500. The building and machinery were insured for \$14,000, which, it is believed, will cover the loss, as the boilers and pump and three of the engines and drums are not thought to be seriously damaged. Temporary boilers have been procured so as to keep the mine free from water. An air compressor will be working in a few days, when hoisting will be resumed.

The Lockout Nearing An End.

Judging by the rapidity with which the Amalgamated scale is being signed by the Western iron manufacturers, it is safe to assert that the close of the present month will find a majority of the mills in operation at the terms proposed by the Amalgamated Association, and the lockout practically ended. While the prediction may seem strange in view of the apparent firm stand taken by the members of the Western Iron Association at their recent conference meetings, it is nevertheless true. Although the month is little more than half gone, more than 25 firms have already signed the scale and their works are in operation. It is not to be expected that the balance of the manufacturers who have thus far refused to sign the scale will be content to allow their mills to remain idle while their trade is being taken by competitors who have resumed. While it is true that some of the manufacturers may hold out for some time yet, it will be because their repairs are not completed, as they could not operate their mills at present if they wished to do so. The admission must be made that the Amalgamated Association have scored another victory at the expense of the manufacturers.

The manner in which the lockout has ended has already caused considerable ill-feeling between some of the manufacturers and the early disruption of the Western Iron Association is hinted at as the result. While we do not believe that this will take place, there is no denying the fact that there is dissatisfaction and that it may result in the withdrawal of a number of firms. The announcement is made that at the next meeting of the association Chairman A. F. Keating will resign his position and that the firm of Zug & Co., Limited, of which he is a member, will withdraw from the organization. Their course will no doubt be followed by others. The dissatisfaction is said to be particularly strong among the manufacturers of the Shenango and Mahoning valleys and the severing of the connection of a number of firms from these sections will no doubt take place. The claim is made that the manufacturers in the above-named places have for years stood with the Pittsburgh manufacturers and engaged in strikes on the promise that the latter were strongly united, and, with the assistance of the outside manufacturers, the Amalgamated Association, could be defeated. When the real test came, however, the Pittsburgh manufacturers were the first to give in and sign the scale. In the future they propose to act independent of the Western Iron Association and will not be governed by it in any way.

Another report has been vigorously circulated to the effect that if the scale is not satisfactorily arranged next year at the conference meetings each member of the Western Iron Association, should it be

in existence, will be required to put up the sum of \$20,000 to bind any compact that may be made. An effort will also be made to include the steel manufacturers in this, as the fact of so many steel firms signing the scale as soon as presented has a tendency to weaken the iron manufacturers and cause them to agree to the terms presented in order to protect their interests. The report further states that this \$20,000 will be forfeited by any firm who signs the scale without being authorized to do so. The truth of this report has been earnestly denied by several manufacturers, and we do not attach much value to it, for the reason that the manufacturers would hardly be laying out a plan of campaign for another lockout until the present one is definitely settled. It is a well-known fact, however, that the manufacturers went into this conflict without being sufficiently united to stand a long suspension of work, and it does not seem strange, therefore, that they have been defeated. A large number had positively refused to state whether they would sign the scale or remain idle, while others said that if certain firms signed that they would also be compelled to do so, in order that they could protect their interests. The following named firms have signed the scale in the order given, in addition to those noted in our last issue:

Jones & Laughlins, Limited, Pittsburgh, Pa.
Central Iron and Steel Company, Brazil, Ind.
Brown & Co., Pittsburgh, Pa.
Long & Co., Pittsburgh, Pa.
Licking Rolling Mill Company, Covington, Ky.
Ohio Falls Iron Works, New Albany, Ind.
National Tube Works Company, McKeesport, Pa.
Jennings, Beale & Co., Limited, Leechburg, Pa.
New Philadelphia Iron and Steel Company, New Philadelphia, Ohio.
North Chicago Rolling Mill Company, Chicago, Ill.
Falcon Iron and Nail Works, Niles, Ohio.

The Commercial Club, of Louisville, Ky., which, as a means of developing various industries, has never had an equal in that State, has aroused enthusiasm enough among the merchants and manufacturers to inaugurate a new movement to advertise the city's business and advantages. A committee have been appointed with plenty of money to draw from, and will act with a well-known expert to arrange for a "Fall Celebration," which will be on the plan of the Mardi Gras of New Orleans, only it will last many more days and be more varied. The yearly expositions are among the things of the past, and, as something is needed to keep the city abreast of her neighbors and attract strangers, it is decided to institute the celebration with a view to make it a regular occurrence. The exact limit and scope have not yet been developed, but it will be on a grand scale.

The Sessions Foundry Company, of Bristol, Conn., are about the largest strictly jobbing foundry in New England. Their line is especially small or benchwork castings, although they make large quantities of other work. During their business year, which ended May 1 last, the amount of their freight received and shipped was upward of 12,000 tons, which furnishes an idea of the magnitude of their business. They make a specialty of a fine quality of iron and smooth, well-molded castings.

The rail mill of the Western Steel Company, at St. Louis, closed down on the 12th inst.

The Iron Age

New York, Thursday, July 19, 1888.

DAVID WILLIAMS, - - - PUBLISHER AND PROPRIETOR.
CHAS. KIRCHHOFF, JR., - - EDITOR.
GEO. W. COPE, - - - ASSOCIATE EDITOR, CHICAGO.
RICHARD R. WILLIAMS, - - - HARDWARE EDITOR.
JOHN S. KING, - - - BUSINESS MANAGER.

It is a curious fact, and a deeply interesting one at this time, that the selling price of steel rails at English works is not more than the mere cost of the labor employed in the production of steel rails in the United States. This has been demonstrated by the figures of one of the leading rail mills of this country. Their entire product for 1887 was considered in the calculation, which embraced all the materials used, beginning with the mining of coal, ore and limestone. The labor employed in the production of minor articles in the shape of mine, furnace and mill supplies was not included, as it would have to be estimated, but the labor entering into the preparation of the leading materials and their manipulation was a matter of almost exact computation. The difference in the cost of manufacturing steel rails in this country and abroad is strikingly shown in the above statement, as the selling price of English rails necessarily includes profits on the preparation and manipulation of the various materials. The only true way to get at the cost of labor entering into the production of an article is to follow it up from its crudest form. In the case of a steel rail the labor does not begin at the pig, the steel ingot or the bloom, but it begins at the mine.

The Copper Situation.

The English newspapers, echoed by a number of our own daily press, are earnestly endeavoring to create the impression that the famous French syndicate is on its last legs. They marshal an array of figures, formidable enough, it is true, to cause some alarm, and affect to believe that it points to an early collapse of the gigantic speculation. It may be confessed that if they keep at it long enough they must ultimately be in a position to point with pride to the verification of their predictions. We doubt whether there are many fair-minded people familiar with the copper trade who would not be willing to go on record as prophets of a fearful break in copper at some indefinite future period. With the exception of a few mine owners who are reaping a golden harvest, the trade in the United States is bitterly opposed to the manipulators of the metal, because they are causing some restriction of consumption and because ultimately a very severe and prolonged depression must follow. They know that the consumer is paying a heavy tribute to foreign speculators.

However unpopular the operations of Secrétan and his backers may be it would be unwise to assume that the clique is losing its grip now and that they are on the verge of a panic. Their control of the situation is too powerful as yet. Their contracts with mining companies embrace the following tonnage, our table giving the prod-

uct of 1887, the output of 1888, as estimated by one of the leading authorities in the world:

	Merton's product 1887 Gross tons.	Estimated prod- uct 1888. Gross tons.	Syndicate con- tracts 1888. Gross tons.
Algiers.....	150	150	....
Argentine Republic.....	170	170	....
Australia.....	7,700	10,000	4,000 Cobar, Moonta
Bolivia.....	1,800	2,000	....
Austria.....	700	1,000	....
Canada.....	1,400	2,000	....
Chili.....	29,150	35,000	3,000 (Panulcillo)
Cape of Good Hope:			(Cape Cop- per Co.)
Cape.....	5,950	5,950	5,950
Namaqua.....	1,300	1,500	1,500 (Namaqua)
England.....	1,500	2,000	....
Germany:			
Mansfeld.....	13,025	14,000	....
Others.....	1,850	2,000	....
Hungary.....	500	500	....
Italy.....	2,500	3,000	3,000
Japan.....	11,000	12,000	9,500
Mexico:			
Boleo.....	1,950	3,050	3,050 (Boleo)
Others.....	100	500	....
Newfoundland.....	1,180	2,000	1,200 (Betts Cove)
Norway.....	1,450	2,500	2,000 (Vignaces)
Peru.....	50	250	....
Russia.....	5,000	5,000	....
Sweden.....	500	1,000	....
Spain and Portugal.....	54,056	60,000	46,500 { Rio Tinto, 28,500 Tharsis, 11,000 Mason, 7,000 (all leading producers) Do. Do. Venezuela.....
United States:			
Lake.....	33,330	40,000	40,000
Montana.....	35,225	50,000	45,000
Arizona.....	8,035	10,000	8,500
Others.....	2,519	5,000	....
Venezuela.....	2,900	5,000	5,000 (Quebrada)
Total.....	224,490	275,570	178,000

So far as is known all but the Japan and the Anaconda contracts are for three years, those named being for one year only. To this may be added practically the whole of the Chili product outside of the Panulcillo, say 32,000 tons. Though this copper is not contracted for, it is bought in Chili or from importers in England at the time of shipment or on arrival in England. It is estimated that the syndicate now holds over 45,000 tons, in addition to about 20,000 tons of English copper. A review of the status of affairs so far as the remaining quantities are concerned shows the following: The product of Austria, Hungary, Germany and Russia, in all estimated at 22,500 tons for 1888 is taken care of by local consumption. This leaves an estimate of 38,090 tons of outside floating copper from all sources, which the syndicate must either take care of ultimately in some shape or other or which cuts out so much metal from the trade of the companies controlled by it. That it is doing so is proven by the statement made in the last circular of Messrs. James Lewis & Sons, of Liverpool, who state that little of the Rio Tinto, Tharsis and Cape copper produced at the smelting works of those companies during the first six months of 1888 has been sold, the stock thus accumulated being the 20,000 tons of English copper already referred to.

That the speculators are carrying an enormous burden is certain. All the producing countries of the world are industriously pushing supplies to the European markets. For the first six months of 1888 the imports of copper into England, France and Italy, exclusive of pyrites and precipitate to English outports were 64,896 tons fine, against 40,049 in 1887, and 50,925 tons for the first six months of 1888. Of this the United States is credited with 8690 tons in 1886, 7220 tons in 1887, and 19,209 tons in 1888. By far the

greater part of it, not less than 16,803 tons fine, has come from one mine, the Anaconda, of Butte City, Mon.

While supplies have thus materially increased and deliveries have fallen off must not be forgotten that the statistics visible supply are to some extent misleading. During the eight months since the famous upward rush of copper, stocks of raw materials and of manufactured goods in all manufacturing countries have been run very low. The whole world has scoured for old copper and old brass in every imaginable form, and that substitute for new metal is now pretty nearly exhausted, too. Therefore, while production is increasing, consumption of new metal too, must prove heavier, though it must be far below the accumulating supplies.

One important consideration is evidently forgotten by those who are talking of an early collapse of the metal. While the syndicate has reserved special powers for ordering a reduction of output in only a few of its American contracts, it may readily be conceived that it might succeed in bulldozing other contracting mines into lessening production. A threat to involve them in the general loss which would follow the failure of the Société des Métaux and the syndicate might make them willing to aid it by some sacrifices of output. It is believed by good authority that when the break should come, £30 for Chili would not be an unusual figure for some time. Rather than see such a calamity come about the large companies might be willing to strengthen the hands of the speculators by agreeing to restrict production. So far that contingency has not arrived, but it is likely to precede a serious decline.

Domestic Motors.

Within the past six or seven years development in the line of what may be some reason be termed domestic motors has been unusually rapid, and in addition to several of the older and already well known engines of this type a large number of new forms have been brought into extensive use. We need perhaps scarcely explain that under the head of domestic motors may be embraced those engines which are mainly designed with the view of being intrusted to unskilled management, and which accordingly dispense with the use of an independent power generator, such as a steam boiler. It is interesting to note, however, that the demand for such engines has not been limited to those who cannot provide for attendance with any engineering qualifications without speaking of, but has extended to a large number of power users who have found that such motors efficiently meet their requirements. The application of small engines of special make to such home service as pumping water and running ventilators and sewing machines is familiar, and has apparently had the effect of demonstrating that even larger powers, required for the heavier work of operating printing presses, small machine shops, electrical light installations, &c., can be satisfactorily obtained without resorting to steam engines or to water-wheels which require special location and usually expensive accessories.

At the present time the gas engine undoubtedly performing the largest share

of the work done by the whole class of domestic motors, so-called, and, in many instances, has shown itself to be a formidable rival of the steam engine, successfully driving machinery for which only a few years ago it was considered not at all well adapted. In capacity the engine has experienced a steady increase, the originally small sizes of fractional horse-power, and of one, two and five horse-power, though still turned out in large numbers, having been followed by 10, 20, and, quite recently, even by 50 horse-power engines—ample evidence of the growing popularity and fitness of the motor for comparatively heavy duty. From the single-cylinder engine it was but an easy transition to a design calling for two cylinders, and this again prompted the building of four-cylinder engines, some of which, of the Otto type, have been turned out abroad, the aim being, we understand, to secure greater regularity of working and higher economy in point of gas consumption. We do not know whether these designs accomplished all that was expected of them, but, in any event, the increased cost of maintenance and the complication of parts which they naturally entailed, detracted, in some measure, from their claim of belonging to a class of engines which required no skilled attendant and which were not subject to frequent derangement. Simplicity of construction is a very important matter—in fact, it is of the first importance in any engine which is to suffer the abuse of untrained handling, and, despite some of its shortcomings, the single-cylinder gas engine will, therefore, in all probability, remain in favor for some time. This seems to be borne out, moreover, by the fact that nearly all the recent designs are of this type, a circumstance of which the weight will be all the more appreciated when it is considered that such designs have been brought out in large number, foreign engineers having been particularly active in this respect.

Closely allied to the gas engines are the various forms of petroleum motors, which have been given prominence of late. In these a mixture of air and petroleum in the form of vapor or spray is introduced into the cylinder and fired. Where a supply of gas is not available, these engines offer special advantages, and would seem to be assured of a favorable reception; and it is but natural therefore that both in this country and abroad their introduction is being vigorously prosecuted.

Hot-air engines are now so well known that we need scarcely more than mention them here. Their principal use hitherto has been confined to pumping water in buildings, for which purpose they are peculiarly well adapted and extensively manufactured, one works alone in New York turning out about 600 per annum. While it is questionable whether for the present they will be employed to any very great extent for general low power purposes, it is interesting to note that they are built by several engineering firms with this end in view, and are also employed in the English and in the United States lighthouse service for compressing air for operating fog-horns. Their simplicity and convenience are generally recognized, but these good features are in a measure overshadowed by the fact that, compared with other motors of equal power, they are large and cumbersome pieces of machinery.

In the line of water motors there has been no lack of progress, and small power users now have the choice of a large number, all of them being claimed to be efficient and generally satisfactory. In some localities where a comparatively high water pressure is maintained in the city supply pipes, these motors have been used to the exclusion of many small engines of other types designed for similar work, and, to all appearances, with very good results, their entirely harmless character, ease of management and cleanliness tending largely to make them popular.

One of the later arrivals in the field of small engines for household and other uses is the electric motor, of which the wide range of usefulness is at once apparent. Its application to driving elevators and ventilating fans has secured for it a fair proportion of public favor, and has more recently been followed by its adaptation to pumping and other work of a general character. For obvious reasons, however, its use is at present limited to special localities. Before leaving the subject we cannot but refer to the several forms of small steam engines which are now on the market, and which, while embracing steam generators, have been designed specially with the view of being managed by unskilled attendants. The boilers are heated by kerosene, and the whole outfit is perfectly automatic in its working, the regulation of the fires, steam-pressure, water-level, &c., being entirely independent of the attendant. The element of danger from carelessness or ignorance is thus practically eliminated, and the engines are not without just claims to a place in the class of motors which we have considered.

A shipment of 600 tons of Lake Superior charcoal pig iron was made to England last week by the Elk Rapids Iron Company, of Michigan. The sale was negotiated by F. H. Head, of Chicago, vice-president of the company, who has conducted similar transactions in years past, although this is considerably the largest. Mr. Head states that such shipments are only possible in times like the present, when the price of charcoal pig iron is very low. Swedish charcoal pig iron is used to a limited extent in England in the manufacture of some grades of steel and of malleable castings. Its price does not fluctuate so much as the price of pig iron in this country, consequently high prices here cut off all chances of trade in that direction, while a return to low prices here renews the opportunity to compete. The price to be met is about \$22 per ton at Liverpool. The freight rate secured on the Elk Rapids iron from the furnace to Liverpool is understood to be \$4 per ton. It is carried wholly by water, going to New York by lake and canal. At New York it will be transferred to a steamship of the Inman line. It will be seen that the price netted is the ruling rate for Lake Superior charcoal pig iron at furnace. Part of the iron will go to Derby, England, and part to other points of consumption in that country. Our readers generally do not need to be informed that this shipment of pig iron from America to England is of a special character, and that it does not mean a serious invasion of the English home market. Probably one Michigan blast furnace would be able to keep England supplied

with all the charcoal pig iron required, as its use is quite limited. It would seem to be needed for malleable iron castings to a great extent, but they are not so widely used in England as in this country, owing to the cheapness of forgings answering the same purposes.

The Railroads Projected in Porto Rico.

Since American enterprise undertook railroad building in Mexico some ten years since, and endowed that country with a system now exceeding 6000 km., other nations begin to take in hand similar undertakings in countries South of us, in which nothing of the kind had been attempted, although it was more than probable that they would prove as remunerative there, perhaps even more so. Strange to say, the lesser Spanish Antille, Porto Rico, although the most populous Spanish colony, has so far been overlooked, and has been without a mile of railway. Now, however, a railroad is to be built without delay to run along the entire coast. The engineering obstacles to be overcome will be slight, comparatively speaking, nor will there be much difficulty in procuring workmen at moderate wages on the spot. A great impulse will be given to the development of agricultural and pastoral interests in the island by the railroads planned, a matter of no small interest to American trade, our export of domestic products increasing in that direction at a rapid pace. The planting interest centers upon the three chief products, sugar, coffee and tobacco. Sugar is cultivated along the entire coast, and the quality is very fair; coffee is grown in the mountain districts, also of a most desirable quality, while the tobacco culture occupies small farmers on the plateau, and produces a merchantable leaf of medium quality. Sugar has been so low that at times planters have found it difficult to make the two ends meet, but some of them partially resort to rum distilling, thereby improving their income, a few distilling even bay rum. Coffee has paid the planters well during the last two years, and in some shape or another the population manages to flourish more than elsewhere in the West Indies, which accounts for their taking American goods more freely.

There is no difficulty about labor; the 90,000 freedmen all work at moderate wages, and so do the white working classes. While the island has only an area of 9314 sq. km., the population numbers 900,000, having increased as follows:

1834.....	258,836	1867.....	731,648
1846.....	443,139	1883.....	810,394
1860.....	583,308	1887.....	900,000

The population of the cities is as follows: Ponce, 37,545; San German, 30,146; Mayagüez, 26,446; Arecibo, 25,754, and St. Johns (the capital, a fortified place), 23,414. The concession to build the 546 km. of railway, 468 of which to run along the coast, was granted at Madrid by adjudication on March 5 last for 99 years in the round sum of 49,640,000 pesetas or francs and comprises the ensuing localities and distances from St. Johns to Mayagüez via Arecibo and Aquadilla on the northern coast 185 km.; from Mayagüez to Ponce via San German, 90 km.; from Rio-Piedras to Humacas via Fajardo, 96 km.; from Ponce

to Humacas via Arroyo, 125 km., and from Caguas to Humacas via Juncos, 0 km. The last four lines connect the western coast with the eastern through the southern and partially through the interior. The Spanish Government guarantees 8 per cent. interest per annum on the sum of money named. The Porto Rico Railroad Company were formed at Madrid on May 17, 1888, and on June 8 the Government confirmed the concession as vested in the company named, thus incorporating the same. The share capital of the company is 16,000,000 pesetas or francs, and a contract was made with the Porto Rico Railroad Company to commence building at once the 275 km. from St. Johns to Ponce via Mayagüez, that being the most important line. The construction company have a share capital of 2,500,000 pesetas.

There being 95 inhabitants to the square kilometer in Porto Rico, prospects of a large traffic are most encouraging, since in France there are only 72 inhabitants per square kilometer; in Portugal, 48; in Spain, 32; in Cuba, 18, and St. Domingo, 11.

The island being comparatively small there are only 833 km. of telegraphs in operation, with 35 offices, of which 14 are Government and 21 are municipal, the island being divided into 71 municipal districts. The Porto Rico sugar crop was large last year, when 81,355 tons were exported. The United States received 131,443,632 pounds of it. In 1886 only 59,333 tons were shipped, and in 1885 the shipments reached 88,959 tons. In the latter year there were also shipped 21,669 tons of coffee, 80,645 tons of molasses and 3495 tons of tobacco. Cattle exportation to other W. I. islands is also considerable. The import into the island in 1885 was \$11,745,022, against \$13,132,293 in 1884; the export was \$14,048,639, against \$11,618,888. There entered in 1885 1648 vessels of a joint tonnage of 108,896, and sailed 1544 with 147,125. American trade increased as follows:

Calendar year.	Import from Porto Rico.	Domestic export.
1887.....	\$4,515,684	\$1,883,079
1886.....	4,093,245	1,579,148

The budget for 1887-88 estimates the income of the island at \$3,550,372 and the outlay at \$3,551,841.

An agreement has been arrived at between the United States and Spain, prolonging the existing commercial arrangement having reference to the Spanish colonies, pending the conclusion of a more ample treaty. The agreement may be terminated on two months' notice being given by either side.

The evidence thus far brought out concerning the alleged dynamite conspiracy among discharged employees of the C. & Q. Railroad Company, members of the Brotherhood of Locomotive Engineers, is exceedingly damaging to that body, unless it can be proved that they have no complicity in the plot. It is essential to their reputation as law-abiding citizens that the circular signed "S. E. Hoge, chairman of the General Grievance Committee," calling for men "to disable engines in every way they can," &c., shall be proven to be a forgery. Thus far five engineers are under arrest and General Manager Stone of the railroad company tells a startling

story respecting the character and extent of the plot with which they are declared to be prominently identified. The best course for the Brotherhood is to repudiate all connection with this alleged diabolical business, and as evidence of their good faith lose no time in "calling off" a strike that only serves to foster the worst passions of men, besides affording a standing example of insubordination and lawlessness for which there is no possible justification. As the case stands it looks very black for Chairman Hoge and his friends, and his overtures for a compromise coupled with the menace of a general strike should the railroad company continue its "persecution" (prosecutions), can hardly relieve the strain of the situation. In truth, should not any form of bulldozing be indignantly spurned? The Brotherhood, at least as individuals, entirely repudiate all connection with the infamous plot now plainly revealed, and beyond any question are prepared to sustain the laws, in common with the community at large, as against any form of anarchic devices.

All-Rail Shipments of Lake Superior Ores.

Attention having frequently been drawn to the probable transfer of a considerable proportion of the iron ore tonnage of the Northwest from lake vessels to all-rail routes, we have collected information on the subject from the railroad lines interested. The result of these inquiries is somewhat disappointing to those who believed that a very considerable share of this trade had been diverted from its old channel. We find that the entire all-rail shipments of Lake Superior ores to Milwaukee and points south of that city amounted to but 75,349 gross tons between December 1, 1887, and May 1, 1888, against 99,385 tons between December 1, 1886, and May 1, 1887. These figures show not only the limited extent of the all-rail movement of Lake Superior ores, but also a decrease in the past season as compared with the previous one. This, however, should not be taken to indicate the course of trade in the future, special reasons existing for the decrease, which will be noted hereafter.

The railroad companies over whose lines the ore was hauled embrace the Chicago and Northwestern and the Milwaukee and Northern, from the Menominee and Marquette districts, the Chicago, Burlington and Quincy with the Chicago, Burlington and Northern, from the Vermillion district, and the Milwaukee, Lake Shore and Western and the Wisconsin Central, from the Gogebic district. The bulk of the tonnage was hauled from the Gogebic mines—namely, 96,936 tons in 1887, and 67,391 tons in 1888. The Vermillion mines made no all-rail shipments in 1887, this movement with them beginning in 1888.

With these figures before us, and a knowledge of the condition of the iron trade, it is easy to account for the falling off in all-rail shipments in the past season. In 1886-87 the demand for iron ore was very heavy, owing to the prosperous condition of almost every branch of the iron business. The Gogebic mining district was also in the full enjoyment of its boom, and mine owners were pushing the work of developing new deposits, in order to

help the sales of mining shares. During the past season, however, the iron trade was dull and depressed, and for a considerable part of the winter the output of the iron and steel works of Chicago and vicinity was greatly restricted, so that much less ore was consumed. The collapse of the Gogebic speculation also stopped shipments from all but the southern and properly worked mines. This change in the condition of affairs came very suddenly after the all-rail movement had been inaugurated. If it had been delayed two or three years the results would have probably been more in harmony with the expectations of the believers in the ultimate absorption of the ore-carrying trade by the railroads. The first points the railroad companies had to demonstrate were cheapness of service in comparison with vessels and the assurance of reliable winter deliveries when vessels were unable to run. Both have been very satisfactorily demonstrated by this time, and the foundations are therefore, laid for the future. Although vessel rates are much lower this summer than they were last year, ore shipments are now being made by rail and will continue the whole year round.

This significance of this change in the methods of transportation is of great importance than simply a transfer from one set of freighters to another. It means the manufacture of pig iron in the Northwest under more favorable conditions than have heretofore existed. Under the old system a sufficient quantity of ore had to be stored at the furnace in summer to last until navigation reopened. This required a heavy outlay of capital and also prevented a furnaceman from taking advantage of sudden changes in the condition of the trade. A heavy stock of ore would compel him to run until it was smelted, even though prices ruled below cost, while, if he had decided not to lay in a stock in summer, he was unable to take advantage of a favorable turn in the market during the winter, because of the impossibility of securing ore. Freed from the necessity of carrying a large stock, a furnaceman is also able to buy ore to greater advantage from competing mine owners when trade is depressed. For these reasons, and others the iron and steel manufacturers of the Northwest take a lively interest in the development of the all-rail movement.

The United States Commissioners to the Paris Exhibition are Gen. Wm. B. Franklin and Somerville Pinkney Tuck, who have just received their credentials from the President, and are now in this city engaged in the preliminary work of preparing documents for distribution, having opened an office at 35 Wall street. They already predict a good representation of objects from America. The space allotted is about 7000 square yards. The freight charged out and return are defrayed by the Government, from the Congressional appropriation of \$250,000 in aid of the exhibition. The commissioners are also allowed the free use of the mails. The exhibition opens May 5, and closes October 31.

It is reported that Mr. H. F. DeBelen, of Birmingham, Ala., is agitating the idea of arranging for storage of Southern furnaces as the basis of issues of warrants. The scheme has been laid before capitalists, but that feature of it which aims at making the yards adjoining furnaces themselves the storage point does not appear to meet with approval.

CORRESPONDENCE.

Terms of Payment on Pig Iron.

Since the publication of our last issue we have received a number of letters on this subject, some of which we give below. We repeat the questions which called them out:

1. Does four months' time on pig iron mean from date of shipment or date of receipt of the iron?
2. If cash discount is taken, is it taken from the date of the furnace shipment or from the date of the receipt of the metal?

CINCINNATI, July 10, 1888.

To the Editor: In reply to your circular letter of July 5, our understanding is that four months' time is from date of receipt, if iron is sold, as is usual, f.o.b. cars at the city of the purchaser; or, if, as is sometimes done, the iron is sold f.o.b. furnace, it refers to date of shipment. The former, however, is the general practice. If cash discount is taken it is taken from date of receipt of the metal.

THOS. A. MACK.

LOUISVILLE, KY., July 10, 1888.

To the Editor: The time for dating a note on a four months' contract for pig iron depends upon the conditions of the sale. If the iron is purchased on cars at the furnace, then the notes should be dated from the date of shipment. On the other hand, if the purchase is made delivered at some distant point, the note should be dated from the time of the arrival of the iron. Custom, however, has fixed it differently—that is, settlements are usually made on the first of the month following the delivery. The conditions of a cash discount are in main covered by the above. It should be taken from date of the furnace shipment if purchase is made at the furnace, or, if made for delivery at another place, then it should be taken from the time the iron arrives at point of destination. Yours truly,

HALL BROS. & CO.

LOUISVILLE, KY., July 9, 1888.

To the Editor: There is no custom in this market that regulates the time from which four months' paper for pig iron is dated. As far as possible the seller endeavors to obtain his paper from the date of shipment, but as the buyer generally makes the paper it is oftener dated from time of receipt (or even a short time after that) than it is from the time of shipment, and sellers generally accept notes as received, unless the time taken is too long to be admissible. If parties pay cash instead of giving notes, where they have privilege of four months, they generally take discount for four months and remit up to the time they would otherwise give their notes, unless these cash settlements are unusually delayed, in which case the deduction is generally made for the unexpired time. The trade suffers from these irregularities which creep in during times of great anxiety to sell and producers submit to concessions asked for by buyers. In seasons of scarcity the lines are drawn more closely. Some general conference among furnaces and a settlement of these questions would be of great advantage to them, and greatly facilitate business. Another abuse that has crept into the Western market, and which should be corrected without delay is the custom of giving 2268 pounds for a ton. This originated many years ago—in fact, years before the war, and grew out of the fact that pig iron molded in sand carried about this weight of sand as compared with foreign iron which reached here, and iron molded in iron molds, which was without the sand. We are glad to see the matter taken up and hope it will be agitated until these irregularities are settled. Yours truly,

G. H. HULL & CO.

Porcelain-Lined Iron Pipe.

HAMMONTON, N. J.

To the Editor: Can any of your readers inform me who manufactures porcelain-lined iron pipe 1½ to 3 inch? S. E. B.

Nickeline.

WASHINGTON, July 14.

To the Editor: Please inform me who makes a metal known as "Nickeline," silvery, in rods, sheets and wire. J. B. K.

Washington News.

(From Our Regular Correspondent.)

WASHINGTON, D. C., July 17, 1888.

The tariff debate in the House is in its closing stages. The free wool provisions over which there was so much anticipated parliamentary skirmishing went through with barely a struggle. The vote, which stood on the Wilkins motion to strike wool out of the free list, yeas 102, nays 120, is regarded as a test. Although a larger vote is anticipated on the passage of the bill in the House the trial of strength on Monday settled the status of dubious Democrats and Republicans.

The protection Democratic wing mustered under the leadership of Randall when the discussion began not less than 11; when the vote was taken on free wool, which was the most important feature of the bill, and admitted to be a safe gauge of its strength, but three responded. The Democratic opposition in the beginning was made up of Randall and Sowden, of Pennsylvania, Vance, of Connecticut, Merriman, Stahlnecker, Greenmare and Tracy, of New York, McAdoo and Piddock, of New Jersey, and Foran and Milkins, of Ohio, on Monday. Sowden, Foran and Milkins alone voted. Randall was ill and Merriman was absent from the city. Had they been present they would have swelled the list to five, which would still have been insufficient to defeat the provision. The defection was due to the careful and sagacious amendment of the bill by the Committee on Ways and Means in certain interests. This drew over the deserting members from the protection Democratic ranks into the rival camp and made the passage of the bill possible. The Republican support of free wool also failed to come up to the mark. Knut Nelson, of Minnesota, voted with his party, as did Anderson, of Kansas. Fitch, of New York, was absent. The only vote, therefore, which Chairman Mills received for his proposition from the Republicans was Anderson, of Iowa.

The final vote on the bill may now be reached at any time, and under ordinary contingencies not later than Saturday. There only remains to be discussed the administrative features, which are not likely to call forth any very earnest or protracted debate. The Senate sub-committee are hastening all in their power to have their substitute ready at the earliest moment. When the House bill reaches them they will go over its provisions as a matter of information, but will submit their substitute to the Senate as soon as completed, which will be in about two weeks. The determination of the sub-committee is to urge the passage of the substitute. The Democratic Senators show a disposition to discuss the measure. If they carry out such a programme the tariff debate in the Senate may run the subject well into September.

The Senate bill reduces the revenues by a very different method. The principal items are the repeal of the internal revenue taxes on tobacco and fruit brandies, and a portion of the duties on sugar and alcohol used in the arts, which will aggregate upward of \$60,000,000 or \$70,000,000. There will be opposition to removing the

tax on fruit brandies, as such a step, it is claimed, will open the way to evasion of the tax on spirits by claiming all spirits to be fruit brandy by the introduction of a minimum of fruit in the manufacture.

The West Point (N. Y.) Foundry Company and South Boston Iron Works made similar bids for machine finishing and assembling of six or twelve 6-inch steel breech loading guns. Their figures were, six 6-inch guns, \$20,400; time, 13 months, or 12 6-inch guns, \$40,800, in 19 months. The forgings will be finished by the Government as soon as possible. Each 6-inch gun will weigh about 10,000 pounds.

The bids for steel for the armored battleship Texas, to be built at New York, will be opened on the 22d inst. In August proposals will be wanted for materials for the armored cruiser Maine, to be built at the Brooklyn yard.

The Cost of a Ton of Pig Iron in the Sequachee Valley.*

BY WILLIAM M. BOWRON, SOUTH PITTSBURG, TENN.

An interesting calculation was made at the Chattanooga meeting of 1885 as to the cost of making a ton of pig iron in the Chattanooga and Birmingham districts. Since that time new territory has been opened, new railroads have been built and recent construction has remedied some of the leakages of former practice. The metallurgy of the ores of these districts and the capabilities of their fuels are now clearly sustained; but the old question, How much does it cost to make a ton of iron? is still unanswered, so far as popular knowledge goes. Cost-accounts are considered, in this district at least, as close secrets; and I am not prepared to betray them, for the excellent reason that I have never had access to the cost-account of any firm making iron in these districts.

Probably if I had sought such special information I could have got it, but it would not have been available for publication, and its possession would have rather been a source of embarrassment than aid in the independent investigation that I have made. Besides which there are peculiarities in the conditions of most firms that prevent them from being representative of their neighbor's practice. My first idea was to try to get in confidence such figures as might be averaged; but a very little study made me abandon this, if for no other reason than that the difference in matters that were included in cost would render such average worthless. For example, one operator builds 50 coke ovens and charges them up to "general expenditure." His neighbor, building the same number, charges them up to "capital account." The figures of cost on the same make and under similar conditions would not be identical. I now propose to give some data of cost that may assist those making their own calculations for any specific locality, premising that my figures are based on Sequachee Valley practice, as the district most familiar to me. It is but simple justice to the Tennessee Coal, Iron and Railroad Company to state that none of the figures have been derived from their work. Owing to their special facilities they work one department into another, and the figures I arrive at should not be quoted against them. I am dealing with a furnace built in Sequachee Valley to work its own local ore and coal to buy its soft ore. The materials included in Sequachee Valley are ore and coke. Hard ore is worth 75 cents per ton, and soft ore can be had for about \$2.25 per ton, delivered. A working mixture is:

Hard ore.....4,200 pounds
Soft ore.....3,500 pounds

* Read at the Birmingham meeting of the American Institute of Mining Engineers.

Allowing the hard ore to run 30 per cent. and the soft ore 50 per cent., this charge would give 3010 pounds of iron. Reducing the ore to that required for 2000 pounds of iron we have:

Hard, 2757 pounds, worth.....	\$1.034
Soft, 2325 pounds, worth.....	2.615
Add 10 per cent. for waste, moisture, &c.	.365

Ore per ton of iron..... \$4.014

The next item is coke. Analyzing its probable cost I have from different sources and composite data got the figures below.

I have made an attempt to divide up the cost of mining as follows:

	Cents.
Mining coal.....	50.0
Air course and entry.....	12.5
Incline.....	.30
Superintendence, clerks and offices.....	.25
Mules, drivers and outside labor.....	.58
Tipple.....	.25
General expenses, i. e., taxes, insurance, exhaustion of land, &c.....	.75
Timber.....	.25
Total.....	87.3

On cars at mine. Coked in 11-foot ovens, holding 4 tons of coal, 100 bushels of this coal gives 115 of coke; or 8000 pounds of coal gives 4600 coke. The cost of this may be divided thus:

	Cents.
4 tons coal per oven.....	3.492
Charging, leveling, bricking and drawing.....	.500
Loading.....	.250
Repairs.....	.050
Extra labor, switching, weighing, &c.....	.150
Total.....	4.442

Or \$1.929 per ton of coke on cars at ovens. To make a ton of pig iron with this coke takes 2748 pounds of coke, worth

Net cost.....	\$1.929
Waste and braise, 10 per cent.....	.193
Total.....	\$2.122

Or \$2.915 per ton iron, plus the freight for hauling from coal mines to furnace.

To recapitulate:	
Ore.....	\$4.014
Coke.....	2.915

Labor.

We can only arrive at labor by considering the actual production of furnaces using similar materials to those under consideration.

The following wages and labor are taken from actual practice:

	Rate of wages.	Total wages.
2 engineers.....	\$1.90	\$3.80
2 firemen.....	1.25	2.50
2 keepers.....	2.50	5.00
2 first helpers.....	1.15	2.30
2 second helpers.....	1.10	2.20
2 third helpers.....	1.00	2.00
2 stovermen.....	1.10	2.20
1 blacksmith.....	2.00	2.00
1 helper.....	1.15	1.15
1 lampman.....	1.10	1.10
5 water boys.....	.40	2.00
4 cindermen.....	1.15	4.60
1 foreman cinder yard.....	1.15	1.15
14 laborers.....	1.15	16.10
4 horses.....	1.00	4.00
1 scrap man.....	1.25	1.25
1 scales man.....	1.40	1.40
1 scales man.....	1.30	1.30
2 cage men.....	1.15	2.30
2 top fillers.....	1.20	2.40
2 top fillers.....	1.15	2.30
9 ore fillers.....	1.00	9.00
8 coke fillers.....	1.00	8.00
4 ore breakers.....	1.00	4.00
4 ash men.....	1.00	4.00
2 water boys.....	.40	.80
1 foreman.....	1.45	1.45
25 1/2 laborers on ore in stockhouse.....	1.00	25.50
Total.....		\$115.90

Switch engine and yard crew.....	20.00
Superintendence and clerks.....	20.00
Total.....	\$155.90

or an average make of 85 tons per day, or \$1.834 per ton. We have then:

Ore.....	\$4.014
Coke.....	2.915

Labor.....	1.834
Stores.....	.250
(This includes railroad iron, oil, coke-forks, sand, lumber, &c.).....	
Total.....	\$9.013

being the cost of making a ton of pig iron less the cost of bringing the fuel to the furnace, which is supposed to be located near the mine in the Sequachee Valley, and 25 cents should cover it. There only remains to add for repairs and depreciation of plant 10 per cent. on \$100,000 investment and 6 per cent. interest on the same for use of the money (for the only safe way is to regard the money invested as borrowed). These, calculated on 30,000 tons per annum, are:

Depreciation.....	\$6.25
Interest.....	.15
Brought forward.....	9.013
Total.....	\$9.413
Probable freight on coke.....	.25
Total.....	\$9.663

As this is a ton of 2000 pounds the cost of a ton of 2240 pounds will be, according to the above figures, \$10.82. The allowance for sand in the pig-iron ton does not require to be made here. Local conditions vary, but the figures above will come very near the truth in Sequachee Valley, where ore and coke are only 4 miles apart in a direct line, and can commercially be united by rail inside 20 miles. As a basis for comparison this estimate will be useful if only to check the wildly small estimates of the authors of "boom" literature and their residuary legatees, the tariff-tinkers. Unless conditions are favorable, construction suitable, and management good, these figures will be exceeded. Distance from market becomes a further factor in the question of "profit and loss," but I am simply regarding here the cost of making a ton of iron in Sequachee Valley.

The Ohio Valley Centennial Exhibition.

Among further exhibits in the machinery department at the Ohio Valley Centennial Exhibition, at Cincinnati, which lack of space prevented us from noticing in our last issue, is one by the Universal Radial Drill Company, of Cincinnati. This company show their Universal drilling machines in several sizes, the machines being adapted to a large range of work. They exhibit also their radial drilling machines, with powerful gearing to spindle, quick return, automatic feed, combined horizontal and vertical faces to table, and pivoted arm having radial movement of over three-quarters of a circle. A new tool, a brass workers' Fox lathe, is also displayed. This machine has a new principle applied in the method of feed. A number of different sizes of bench and several upright drills complete the display.

The Cincinnati Screw and Tap Company show their Universal milling machines in different sizes, machine screws, taps, dies and die-stocks.

J. K. Krugg & Co., Cincinnati, Ohio, exhibit the Heine safety boiler, made by the Heine Safety Boiler Company, of St. Louis. Two of these boilers supply steam to the exposition.

The Diebel Mfg. Company, of Philadelphia, Pa., exhibit a complete line of their Challenge grinding and polishing machinery, emery wheels, &c., through their agent, H. H. Walter, Cincinnati, Ohio.

J. H. Day & Co., Cincinnati, Ohio, display dough-mixing machinery, power flour sifters, grinders and odorless cooking pots.

The Jeffrey Mfg. Company, Columbus, Ohio, exhibit their anti-friction roller

chain belting, detachable link belting, elevators, conveyers, coal mining machines and power coal drills.

J. J. Brown & Co., agents, Cincinnati, Ohio, exhibit several styles of Red Jacket force pumps.

The Lightning Fence Machine Works, Middletown, Ohio, make an exhibition of the Lightning Fence machine and its product, and also of force and common well pumps.

The Advance Mfg. Company, Hamilton, Ohio, exhibit a line of cider presses, ice tools, &c.

The Foos Mfg. Company, Springfield, Ohio; display the Scientific grinding mills and oil cake mills in several styles and sizes, also the Scientific portable forges.

The Lagonda Mfg. Company, Springfield, Ohio, also exhibit several grinding mills, crushers and the Eclipse post-hole diggers.

E. D. Shays & Co., Cincinnati, Ohio, show an extensive assortment of heavy hardware and factory supplies, including a full line of the Ashtabula (Ohio) Tool Company's productions, consisting of forks, hoes, &c., the Buffalo Forge Company's forges, blowers; also a line of up right drills, belting, &c.

Schaffer & Buddenberg, New York City, provide a very handsome display of brass steam gauges, &c.

The Edinburgh Pulley Company, Edinburgh, Ind., have on exhibition a large line of the Self-Locking Wood Split Pulleys.

The Walker Mfg. Company, Cleveland, Ohio, exhibit a line of steel-rim pulleys, patent molded gearing, power-transmitting machinery, shafting, hangers, &c.

The Eclipse Pump Company, Cincinnati, Ohio, have an interesting display of steam and air pumps in various styles and sizes, and boiler feeders.

The Gordon Steam Pump Company, Hamilton, Ohio, display heavy double-acting pumps, suitable for water-works and wherever great capacity is required.

The Cordesman Machine Company, Cincinnati, Ohio, show a variety of wood-working machinery, including band saws, carving machines, jig saws, boring machines and a spiral twist molder.

Post & Co., Cincinnati, Ohio, provide an extensive display of the Acme Machinery Company's (Cleveland, Ohio) productions.

The Cincinnati Brass Works have a well-arranged display of their lubricators, brass castings, automatic oil feeders, &c.

The Abendroth & Root Mfg. Company, New York, exhibit the Root water-tube safety boiler and spiral tubing, both japanned and galvanized.

The Lane & Bodley Company exhibit their compound Corliss engine, furnishing power to the exposition. The cylinders are 11 1/4 x 20 x 42. The engine is rated at 140 horse-power, with 95 pounds pressure and develops 1 horse-power with 17 pounds of steam per hour.

The I. & E. Greenwald Company, Cincinnati, Ohio, have one of their automatic cut-off engines in operation. These engines are built in sizes from 60 up to 200 horse-power.

Russell & Co., Massillon, Ohio, exhibit a line of their threshers known under the title of the New Massillon, the improved Dingee-Woodbury horse-power and Pitts-Carey horse-power, portable engines from 4 to 16 horse-power, 6 to 16 horse-power traction engines, saw-mill outfits, and their well-known Russell automatic engines, adapted to a large variety of work and ranging in size from 7 x 12 to 20 x 27.

A reduction of wages of 5 to 20 per cent. has been asked of the men at the Norway Iron and Steel Works, at South Boston, Mass. The men have discussed the matter, but have not yet reached any conclusion.

Foreign Markets.

EQUIVALENTS.

	Cents.
Franc, Peseta or Lira.....	10.1
Florin (Netherlands).....	10.2
Florin (Austria).....	35.0
Milreis (Portugal).....	51.08
Milreis (Brazil).....	54.4
Mark (Germany).....	25.8
	Pounds.
Kilogram.....	220.5
Picul.....	134.

WEST INDIES.

PORT OF SPAIN, TRINIDAD, June 8, 1888.—*Asphaltum*.—Our market has been steady under a good demand at \$14.04 per ton boiled and \$6.84 crude, both inclusive of export duty. Shipments since January 1 have reached 24,536 tons, as compared with only 12,302 tons last year and 11,846 in 1886. *Exchange*, 90 days' sight, \$4.74 @ \$4.80.—*E. P. Masson*.

CHILL.

VALPARAISO, June 1, 1888.—*Nitrate*.—The Anglo-Chilian Nitrate and Railway Company, Limited, have secured 9½ square miles of Nitrate lands in the province of Antofagasta, near the river Loa, about 60 miles distant from the port of Tocopilla, between Iquique and Antofagasta. The Company sent a member of the board of managers to investigate the property, a Mr. Thackthwaite, and his report is favorable. Mr. J. E. Wood, formerly Sub-Inspector of Nitrate Fields on behalf of the Chilian Government, sends an equally favorable report, and so does Don Federico J. Roman, Engineer-in-Chief of the scientific exploring expedition that was sent to investigate the Atacama Desert. The report of the latter two men is all the more valuable as they have no interest, direct or indirect, in the matter.—*Ferro-Carril*.

ASIA MINOR.

SMYRNA, June 25, 1888.—*Hardware*.—The Remscheid and Solingen Cutlery manufacturers of Rhenish-Westphalia have secured a good foothold in this part of Asiatic Turkey, so much so that the articles named have begun to supersede English, after ousting them out of the Needle and Packing-Needle trade. In Wrought Iron and Steel Belgium does the largest business in Asia Minor next to England. In Agricultural Implements and Machinery England remains prominent, in Sewing Machines Germany.—*Pera Gazette*.

EAST INDIES.

SINGAPORE, May 31, 1888.—*Tin*.—Our last report was dated 6th inst.; since then there have been small sales at \$35 down to \$34.50, and buyers now offer \$34 for ready metal, or \$32 for distant delivery, but first hands have not sold a Slab since the collapse, and will continue to hold until forced by necessity to realize. Stocks here are estimated at 600 tons, and up country the quantity in hand is said to exceed 1000 tons. *Tonnage*.—Steamer rates to London are as last quoted, with a steady market. New York via Canal, a small amount of space is offering. Via Cape, the Emily L. Boyd is full, and will sail in a day or two, and the Steinvora has taken the berth alongside the W. Anton. Rates show no change. For Boston there is no fixture. The steamer Antenor took on the 3d inst. for San Francisco, 169 piculs of Tin. *Exchange* is weak at 3¼ for six months' credits.—*Gillilan, Wood & Co.*

MANILA, July 9, 1888.—*Hemp*.—There are buyers at \$8.37½ per picul, against \$8 same time last year, equaling \$28.10, against \$27.50 per ton, cost and freight; there were cleared for the United States since last cable, 6000 bales, against none in 1887; do. since January 1, 97,000, against 123,000; loading 2000, against 6000. Cleared for England since January 1: 184,000, against 107,000 bales; loading for do., 6000, against 10,000; cleared for all other countries 42,000, against 21,000; receipts at all ports since last cable, 13,000, against 10,000; do. since January 1: 314,000 bales, against 242,000, and 203,000 in 1887 and 1886, respectively. *Freight*, \$5.50, against \$5. *Exchange*, 3/5¼, against 3/5¼.—*Ker & Co. to Charles Nordhaus, New York, per cable direct*

CALCUTTA, June 2, 1888.—*Jute*.—Crop prospects in this vicinity continue favorable. There are showers of rain almost daily, and the plant looks vigorous and healthy. The area under culture exceeds last year's by about 12%, so that consumers have prospects of a good supply, if nothing happens to thwart these expectations. As for prices the impression prevails that during the first two months of harvesting the crop prices will still rule high, but with ample receipts to date from October 1 there will be no reason why moderate prices should not rule after the first rush to buy shall have passed by. Our local spinneries will compete lively for a supply, and it will greatly depend on their action whether the ruling will be high or kept sufficiently within bounds to stimulate domestic consumption. Advices from Naraingunge re-

port that so far the crop news there received remains encouraging. Rain was general, and the plant looked well. The rivers were rising rapidly. It was hoped that there would be no necessity to commence cutting till the plant shall have reached its full height. The cutting on the low lands will probably begin by the end of this month. Receipts from Betial and Chowrah may be looked for the first week of July. The area seeded is about 7% over and above last year's. During the week large telegraphic orders were received for early canal shipments, and a big trade was done at 5/½ advance. Balers have now sold August-September deliveries sufficient in amount to pause; any further orders would provoke a fresh improvement. We quote £11.17/6 @ £12.7/6 per ton, cost, freight and insurance, per steamer, September-October shipment.—*Times of India*.

BATAVIA, June 29, 1888.—*Tin*.—The sale of 14,000 piculs Billiton, on behalf of the Government, averaged 48.84 guilders per picul.—*Per Cable via Holland*.

SPAIN.

BILBAO, June 30, 1888.—*Iron Ore*.—Certain descriptions of Ore are scarce, and to some extent there is, besides, a scarcity of miners; at the same time very little has been done in new contracts, and current business has almost arrived at a standstill, at the nominal rates of 7/6 @ 8/ for Campanil and 6/10 @ 7/3 for Rubios. Shipments hence since January 1 sum up 1,893,394 tons, against 2,255,209 last year. *Pig Iron*.—There were shipped during the week 1450 tons abroad and 80 coastwise.—*Bilbao Maritimo y Comercial*.

ITALY.

ROME, July 3, 1888.—*Iron and Steel*.—In spite of the powerful assistance which the Government lends Iron and Steel industry in Italy, what has been undertaken so far has on the whole been the reverse of successful. The most recent failure is that of the Terni Iron and Steel Works, whose labors have given a very poor result, as is shown by the report submitted to the shareholders at their late general meeting. The production of Steel was 30,952 tons, worth 10,941,731 lire or francs, and that of Foundry Pig, &c., 13,308, worth 2,483,133 lire, being about one-half of what these works furnished Italian consumption the previous twelvemonth. The company have been laboring under financial difficulties, but these have been overcome by Government aid and advances made by leading banking institutions, but the balance-sheet shows a loss so far of 2,048,687 lire. It was resolved at the meeting to cut down expenses so far as feasible and strive to improve the condition of affairs through a course of strict economy.—*Sole*.

GERMANY.

HAMBURG, July 7, 1888.—*Iron*.—The outlook in Rhenish-Westphalia has become less reassuring, mainly due to the continued stagnation in Finished Iron, intensified by the stock-taking during the last three weeks. *Pig Iron* has been flat, yet nominally sustained, there being no decline as yet in Iron Ore. Spiegel has been slightly better on more encouraging American advices, and 10% to 12% Manganese now commands 58 marks. Luxembourg Foundry Pig has been bringing 41 marks, and Forge ditto, 38.70; English Bessemer 43/ f.o.b. The rolling mills are booked for six weeks to come, no further, and the current demand for their makes amounts to very little. One of the few branches still flourishing is that of Boiler-Plate manufacture. Thin Sheets are, on the contrary, still neglected. Wire Rods suffer from the absence of an American demand, but Drawn Wire is active. Wire Nail manufacturers are in a bad fix, and their convention is on the eve of exploding. Both machine shops and foundries are still getting on tolerably well, but in nearly all other branches there is a growing complaint that prices are unremunerative because the raw material is too dear. *Metals*.—*Lead*.—Efforts continue to be made by Stolberg and other leading continental producers to constitute a general European Lead syndicate. There is some well-founded hope that they may ere long be crowned with success.—*Borsenhalle*.

Freights on Iron.—The Joint Committee of the Central Traffic Association and Trunk Lines have authorized a reduction of the iron and steel freight rates, which corresponds with the cut made by the Baltimore and Ohio between Pittsburgh and Eastern cities on June 26. The basis of the new tariff is 21 cents per hundred on carload lots, and 20 cents on cars from Chicago to New York. This makes the rates between Pittsburgh and New York 13 cents for carload lots and 16 cents for less; Pittsburgh and Philadelphia, 11 and 14, and Pittsburgh and Baltimore, 10 and 13. The Lake Shore and Michigan

Southern have issued their tariff to correspond to this reduction. Their rates between Pittsburgh and Rochester, N. Y., on bar iron, are reduced from 14 and 11 cents to 12 and 10 cents; between Pittsburgh and Syracuse and Utica, 16 and 13 to 14 and 11; Pittsburgh and Albany, 18 and 15 to 16 and 13; Pittsburgh and New York, 18 and 15 to 16 and 13.

A Long Switch Rod.

According to the *Railroad Gazette* the Lehigh Valley is putting in at Glen Onoko, Pa., a gas-pipe connection for a switch, which is 1255 feet from the point where it is operated. The device is put in under the direction of Dr. H. K. Whitner, the patentee of the Whitner uni-lever switch. The station at this place is situated on a steep grade and on a short tangent. About 500 feet below the station the line curves sharply to the left, and at this point begins a third track, between the two main tracks. The third track is used for freight trains only, and the switch at the entrance of this track has hitherto been operated by the trainmen, who, when handling heavy trains down the grade, would detach the engine some distance above and run ahead rapidly enough to give time for a man to get off and turn the switch before the cars reached it. About 700 feet above the station (1255 feet from the switch) is a single man, and the new connection is put in to enable the switch to be tended by this man. The gas-pipe for the first 700 feet from the switchman's cabin is 1½ inches. At the end of this it crosses underneath the track, the bell cranks at these two turns being placed so as to act as compensators, and the pipe of the remaining distance is 1 inch in diameter. The pipe has to pass gentle curves in the track near each end, but it is run in straight lines and V-cranks put in to change the direction. The large pipe is supported every 10 feet and the smaller every 8 feet. This is believed to be the longest switch connection in use anywhere. At night the man in the cabin knows when a train has passed the switch by the movement of the tail lights, the curve in the line beginning immediately beyond the switch. In case of fog he would have to depend upon whistle signals.

At another point on the Lehigh Valley where Dr. Whitner's levers are in use, a range light is employed to facilitate switching at long distance in the night. The switch tender who is 264 feet from the switch and over 300 feet from the point where cars in going to the side track clear the main track, has a small light fixed on a post in such a position that the movement of the cars always hides the light from him while they are foul of the switch and exposes it to view as soon as they have gone far enough to clear. It will be interesting to know whether this long switch-rod works successfully, as the expansion and contraction, even with the best known methods of compensation, always make the exact movement of a switch a matter of difficulty and uncertainty when long switch rods are used. The rod with connections, &c., may be estimated to weigh fully 1500 pounds, and this feature alone constitutes a formidable difficulty in moving the switch.

Considerable misrepresentation has grown out of the fact that a lot of steel boiler tubes was shipped lately from Boston to the Babcock & Wilcox Company, at Glasgow, Scotland, a branch of the well-known American boiler-makers. We are informed that this shipment was due to the fact that the company found it impossible to fill a specification with steel tubes such as they could obtain abroad and were forced to have them made in this country.

TRADE REPORT.

Chicago.

Office of *The Iron Age*, 95 and 97 Washington St.,
CHICAGO, July 18, 1888.

Pig Iron.—Inquiries are much more numerous than they have been, and buyers are showing greater willingness to close contracts for future requirements. Several important sales of Lake Superior Charcoal Pig Iron are reported, only one of which was made to the agricultural implement trade, the others being distributed among Malleable casting and Car-Wheel manufacturers and the general foundries. A sale of 600 tons of Lake Superior Charcoal was made for exportation to England, the particulars of which are elsewhere stated. A considerable quantity of Coke Mill Iron was sold at \$14 cash, but the purchasers are regarded as fortunate in securing a bargain, the transaction not being considered as an indication of weakness in prices. The market was thoroughly canvassed by them before closing their contracts, and they felt assured that they were getting bottom rates. Part of the Iron taken was Lake Superior and part Southern. Sellers insist that this purchase cannot now be duplicated, as Mill Iron has advanced from 25¢ to 50¢ per ton in the past few days under a revived demand from the rolling mills, which are signing the wages scale and getting ready to resume operations. Bessemer Pig Iron is again reported firmer under an improved demand, consumers finding their wants greater than they had anticipated. Quite a number of Western furnaces, which have been making Iron for the general market, have taken Bessemer contracts to the extent of their full capacity for the remainder of the year, relieving the trade in Foundry Iron to that extent. Sellers look forward quite confidently to an improved condition of affairs in a very short time. Cash quotations are as follows, f.o.b. Chicago: Lake Superior Charcoal, all numbers, \$19 @ \$19.50; Alabama Car-Wheel, Nos. 1 and 2, \$25.25; do., Nos. 3 to 6, \$26.25; Southern Charcoal Foundry, No. 1, \$18; Jackson County Softeners, No. 1, \$17.50 @ \$18; Hocking Valley, Soft Foundry, No. 1, \$16.50 @ \$17.50; American Scotch (Blackband) No. 1, \$18.50 @ \$19.50; other Ohio Scotch Irons, No. 1, \$17.50 @ \$18; Lake Superior Coke, No. 1, \$17 @ \$17.50; No. 2, \$16 @ \$16.50; No. 3, \$15 @ \$15.50; Southern Coke, No. 2, \$16.50 @ \$17; No. 2½ and Open Bright, \$16; No. 3, \$15.50; No. 1 Mill, \$15 @ \$15.50.

Bar Iron.—The evident settlement of the wages controversy in favor of a continuance of the old scale leads a number of buyers to believe that prices will not be likely to go lower. Had a concession been obtained by the manufacturers these buyers would have expected a lower range of values. They now look forward to a stoppage of production by the mills finding themselves unable to realize cost on the present prices of materials and the agreed rate of wages, and are inclined to place their orders for such Iron as they may need. A number of season contracts are in the market from large establishments, while small manufacturing consumers are buying very liberally from mills and from jobbers. The usual mill quotation for Common Iron is now 1.65¢, half extras, f.o.b. Chicago, but some are asking 1.67½¢ @ 1.70¢, while others making a limited range of sizes are willing to take quite low prices on what they can supply. Splice Bars are weak under active competition for larger orders to go South, and are probably quotable at about 1.60¢ here.

Structural Iron.—Quite a demand is experienced for Beams and other shapes for building purposes. None of the orders are very large, but a number of them range from 75 to 200 tons. Store prices are as follows: Angles, 2.40¢ @ 2.70¢; Tees, 2.60¢ @ 2.90¢; Beams and Channels, 3.80¢. Carload lots from mill are quoted as follows, f.o.b. Chicago: Angles, 2.20¢; Universal Plates, 2.25¢; Tees, 2.45¢; Beams, 3.40¢. Notwithstanding the increased number of mills making Beams, and the reported decline in consumption, deliveries are not being made promptly, and builders are greatly annoyed.

Plates, Tubes, &c.—The demand for Plates has been excellent, and very favorable reports are made of the prospects for coming business. Tubes are a little firmer, the mills reporting the receipt of all the orders they can handle at present prices. Quotations from store are as follows: Heavy Sheets, Nos. 10 to 14, 2.65¢; Tank Iron, 2.55¢; Tank Steel, 2.80¢; Shell Iron, 3¢; Shell Steel, 3.25¢; Flange Iron and Steel, 4¢; Fire-Box Steel, 4.75¢ @ 5.75¢; Boiler Rivets, 4¢ @ 4.25¢; Ulster Iron, 3.75¢; Boiler Tubes, 60 % and 10 % off on 2½-inch and larger and 62½ % off on 2-inch and smaller.

Sheet Iron.—Heavy purchasers do not seem to have secured all the stock they will need, as mill representatives are still in receipt of inquiries and are making some sales. They quote 2.95¢ for No. 27 Common, f.o.b. Chicago, in carload lots, but this price can now be shaded, as the wages trouble seems to be about settled, and there will be no shortage in the supply of sheets. Jobbers report the buying movement having begun in the smaller trade, starting up a little earlier than usual. Some sales have been booked for fall delivery. Prices from store are based on 3.10¢ @ 3.20¢, according to quantity, for No. 27.

Galvanized Iron.—The demand for mill lots continues to be very heavy, but prices are sagging, a noticeable change having occurred in the temper of trade in this respect. No quotable change has been made as yet, small lots still moving at 60 % and 5 % off for Juniata, and 60 % and 10 % off for Charcoal.

Merchant Steel.—Large buyers are beginning to make their appearance, but are slow to determine what they will do this year. Those who are out of stock are now buying in carload lots. Such orders, in connection with a fair stove trade, have made business good in the past week. Quotations from store are as follows: Bessemer Bars, 2.30¢ @ 2.50¢; Tool Steel, 8½¢ @ 9½¢; Specials, 13¢ @ 25¢; Crucible Spring, 4.40¢; Open-Hearth Spring, 2.90¢; Open-Hearth Machinery, 2.75¢ @ 3¢; Crucible Sheet Steel, 7¢ @ 11¢.

Steel Rails.—The large orders in sight are still awaiting the negotiation of securities through the usual financial agencies, and, in the meantime, the local mills are forced to be content with orders for small lots. Carload orders are not despised, but received with pleasure and filled with remarkable promptness. Prices for this class of business range from \$32 to \$32.50.

Old Rails and Wheels.—In the absence of sales Old Iron Rails are nominally quoted at \$18 @ \$18.50. Small lots of Old Car-Wheels have been sold at \$18.50.

Scrap.—Buyers are still holding off, while the supply is rapidly increasing, and prices are therefore very weak. For Mixed Country Scrap dealers are quoting \$12. Selling quotations for Carefully Selected are as follows, per ton of 2000 lb: No. 1 Forge, or Railroad Shop, \$17 @ \$18; Track, \$16.50; No. 1 Mill, \$13; Light Wrought, \$9; Horseshoes, \$16.50; Axles, \$22 @ \$23; Cast Machinery, \$12.50 @ \$13; Stove Plate, \$9; Cast Borings, \$8.25;

Wrought Turnings, \$10; Axle Turnings, \$12; Coil Steel, \$13.50; Leaf Steel, \$14.50; Locomotive Tires, \$15.

Hardware.—Heavy Hardware is moving more sluggishly, except Bar Iron and goods going with it into the hands of the manufacturing trade. The demand is quite strong from that direction. In Shelf Hardware the same irregularity exists as stated last week, some houses reporting a very heavy inflow of orders from all classes of customers, while others could dispose of a great deal more business if it would come their way. The explanation is probably to be found in the locality from which trade is drawn. The houses dealing largely with farming communities are directly affected at this time of the year by the concentration of energy upon the growing and ripening crops.

Nails.—A few large orders have been placed with the factories on private terms, but general trade in both Cut and Wire Nails has been quiet. Steel Nails are quoted by the representatives of factories at \$1.87½ @ \$1.92½, f.o.b. Chicago. Jobbers' quotations are still \$2.05 for small lots of Steel Nails, shaded according to circumstances, and \$2.50 @ \$2.60 for Wire Nails, the quantity governing the price.

Barb Wire.—No business is being done here in this branch of trade, as farmers now have no time to make or repair fencing. Nominal quotations on small lots continue at 3¢ for Painted and 3.75¢ for Galvanized.

Pig Lead.—About 400 tons were sold during the week, which opened at 3.90¢ for small lots of Desilverized, and subsequently declined to 3.80¢ @ 3.87½¢, in sympathy with the weakness in Eastern markets. On the 13th inst. the Chicago Department of Public Works opened bids for 100 tons of Pig Lead, the competitors being the Raymond Lead Company at \$3.97½ @ 100 and E. W. Blatchford at \$3.96.

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St.,
PHILADELPHIA, PA., July 17, 1888.

Pig Iron.—There is no change of any importance, and in all leading features last week's report would cover the market at this time. The supply of good Irons is not more than equal to the demand, and prices for such are easily maintained. With other descriptions there is less uniformity, and it is hard to define their position. The supply is only a fair average one, but consumers show no disposition to load up with anything that is not fully up to their requirements, hence there is a good deal of effort required to make sales at prices in proportion to the general market. In fact, it is not so much a question of price as it is of quality. For the present anything that the trade regard as of satisfactory quality will sell at from \$15.50 to \$15.75, delivered, for Gray Forge; \$17 @ \$17.50 for No. 2, and \$18 @ \$18.50 for No. 1, and a trifle more for special qualities. New brands or medium qualities cannot be quoted with much exactness, as there is very little doing, and what there is is usually on private terms. There is not much urgency to sell, however, and as a rule, asking prices are not far from those already quoted, although large lots could doubtless be picked up here and there on specially favorable terms. Evidently the market is a waiting one, and one that will respond easily to any new developments, favorable or otherwise. Meanwhile neither side manifest much interest in the matter, and from present indications the market is likely enough to continue in its present groove for some time to come. The decrease in the output noticed in last week's *Iron Age* shows a falling off in production since January 1,

averaging about 1,000,000 tons per annum, which, doubtless, accounts for the moderate offerings, as well as the steadiness of the market at these very low prices. The starting up of mills in the West may also cause a firmer feeling in Pig Metal, as a portion of the recent weakness was based on the expectation of heavy offerings from the West. But in any event, there is not much danger from that source at the low prices now prevailing in Eastern markets.

Foreign Iron.—It seems hardly worth while quoting, as there is no probability of business being done, prices being much beyond what buyers can afford to pay. Bessemer is nominally \$19 @ \$20, c.i.f., duty paid, and 20 % Spiegel \$26 @ \$26.50. American Bessemer, said to be equal in quality to the foreign article, can be laid down at mills at less than \$18.

Blooms.—There is no change in prices, and only a small business doing at about last week's quotations, which are about as follows, with some concessions on large orders, say, Domestic Rail Blooms, \$28 @ \$28.50, Slabs and Billets from \$29 to \$35, f.o.b. cars at mill, according to analysis; Charcoal Blooms, \$52 @ \$54; Run-out Anthracite \$42 @ \$44; Scrap Blooms, \$34 @ \$35 per "bloom" ton of 2464 lb. Foreign at tide, c.i.f., duty paid, \$29 @ \$30 for Nail Slabs; \$31.50 @ \$32.50 for 4 x 4 Billets, and \$35 @ \$39 for Siemens-Martin, price according to analysis, &c.

Muck Bars.—There is a little more inquiry, and holders are inclined to be firm at the low quotations now ruling, and in some cases are asking a shade more money. Sales chiefly at \$27 delivered, although in some cases \$26.50 has been accepted.

Bar Iron.—There is very little doing in Bars, and prices are something easier than they have been for several weeks past. This is because of the collapse of the lock-out in Pittsburgh and to a general desire to secure orders before competition becomes as active as seems likely that it soon will be. The demand is very light, however, and it is difficult to find buyers willing to take lots of any size. Under these conditions prices are hard to quote, as so much depends on quantity, specification and requirements as to quality. For the general run of orders some mills get 1.8¢ @ 1.85¢, while others have quoted as low as 1.75¢ for 100-ton lots. All depends on circumstances, but for the time being the outlook seems to favor buyers rather than sellers. Skelp Iron is more active, and, as several good-sized lots have been taken within the past two or three days, mills will probably be a little more independent. Sales aggregate to about 1500 tons, at from 1.8¢ to 1.8½¢, delivered, with still further demand at the inside figure.

Plate and Tank Iron.—Prices are hardly as firm as they were a week or two ago, although the mills are all full for the current month. An order for 500 tons Bridge Plate was placed at less than 2¢, and unless for small orders or a specially good quality, this seems now to be an outside figure. Prospects are said to be a trifle better, but there are so many on the lookout for orders that it is almost impossible to avoid cutting, notwithstanding the unprofitableness of business at current rates, which are nominally as follows: Ordinary Plate and Tank Iron, 1.95¢ @ 2.05¢; Shell, 2.4¢ @ 2.5¢; Flange, 3.5¢; Fire-Box, 4¢; Steel Plates, Tank and Ship Plate, 2.3¢ @ 2.4¢; Shell, 2.7¢; Flange, 3¢ @ 3½¢; Fire-Box, 3½¢ @ 4½¢.

Structural Iron.—A very light demand is reported in this department, although there is still a good deal of work going on in connection with old orders. To-day the demand for small lots is better than usual, however, and as there is said to be a large amount of work to come out soon, it is possible that improvement is not very distant. Meanwhile prices

remain as before, say: 2¢ @ 2.10¢ for Bridge Plate; 2¢ @ 2.10¢ for Angles; 2.6¢ @ 2.7¢ for Tees, and 3.3¢ for Beams and Channels, Iron or Steel.

Sheet Iron.—There is not as much doing as might be expected at this season, although mills manage to run full without accumulating much stock. Prices are irregular, but for small lots of best makes quotations are about as follows:

Best Refined, Nos. 26, 27 and 28... 3½¢ @ 3¼¢
Best Refined, Nos. 18 to 25... 3¢ @ 3½¢
Common, ¼¢ less than the above.
Best Bloom Sheets, Nos. 26 to 28... 4½¢ @ 4¼¢
Best Bloom Sheets, Nos. 22 to 25... 4¢ @ 4½¢
Best Bloom Sheets, Nos. 18 to 21... 3½¢ @ 3¾¢
Blue Annealed... 2.8¢ @ 3¢
Best Bloom, Galvanized, discount... 62½¢
Common, discount... 67½¢

Merchant Steel.—The general conditions of the market remain unchanged. Small lots of Tool Steel are selling more freely, and inquiries from large buyers indicate a heavier demand in the near future. Lots from store are quoted as follows: Tool Steel, 8½¢; Machinery, 2½¢ @ 3¢; Crucible Spring 4½¢; Open-Hearth Ordinary Spring, 2½¢; Crucible Machinery, 5¢; Best Sheet Steel, 10¢; Ordinary do., 8¢.

Steel Rails.—There is not much business to report in this vicinity, and prices are still nominally \$30 at mill. It is pretty well understood, however, that orders have been accepted at a lower figure, and on firm offers from desirable parties would be accepted again, but buyers of that character do not appear to be very numerous at this time. In the absence of definite information of sales at lower figures, we quote \$30 at mill, nominal.

Old Rails.—Stocks here are so light, and are held in such a way, that there is practically no market at present. Sales at outside points, however, have been made at from \$21.50 to \$22, delivered at mills, with bids at about \$21, for Philadelphia deliveries.

Scrap Iron.—There is no change in this department, the demand being very slow, and prices without material changes. Sales chiefly at the range of prices as follows, say: \$19 @ \$20 for cargo lots; \$20 @ \$21 for carload lots, delivered, or for choice \$21.50 @ \$22; No. 2 do., \$14 @ \$15; Turnings, \$13 @ \$14; Old Steel Rails, \$19 @ \$20; Cast Scrap, \$14 @ \$15; do. Borings, \$9 @ \$10; Old Fish Plates, \$24 @ \$25. Old Car-Wheels, \$17 @ \$18, Philadelphia, or its equivalent.

Wrought-Iron Pipe.—Manufacturers report an increased demand, and quote prices with considerable firmness, while those in a position to make early deliveries are advancing prices accordingly. Discounts are quoted as follows: Black Butt-Welded, 55 %; on Galvanized do., 45 %; on Black Lap-Welded, 65 %; on Galvanized do., 52½ %; on Boiler Tubes 60 %.

Nails.—Not much doing. Small lots are sold for local delivery, but outside of this things are very quiet. Price is quoted at \$2.05 @ \$2.10 from store, with the usual discount on large quantities. The new "pool" to restrict production, as proposed by Western mills, fails to meet with much encouragement among Eastern manufacturers.

Chattanooga.

Office of *The Iron Age*, Carter and 9th Sts.,
CHATTANOOGA, July 16, 1888.

As is usual through the South, mid-summer has brought a falling-off in general business. Collections are slow and money is hard to get. The banks are very conservative. There is a great pressure upon them in consequence of many holders of real estate notes being obliged to realize. Many purchasers of real estate are yet behind in their payments, which

must result in the end in some sacrifices and depreciation of values. Another thing that acts as a disturbing element in business is the agitation of the tariff and the uncertainty that exists in regard to the effect that the lowering of the duties will have upon the business of the country.

Pig Iron.—During the past week there has evidently been a better feeling in reference to good grades of Foundry Irons. At the present time there is not a surplus of such Irons in the South, and some stacks are much behind in filling their orders for these grades. It would not take a long continuation of these conditions to cause a perceptible advance in prices, for as matters now stand some of the furnaces are not in a condition to accept more orders, and in any event are disinclined to book orders for over 30 to 60 days ahead. There is a drug in the lower grades, but somehow there is no accumulation of any consequence in stocks, and nearly all the yards are showing a very clean appearance. To undertake to quote prices at the present time would be impossible, as where the sales amount to round lots they are generally on private terms. Quite recently the furnaces have found some difficulty in getting cars to make their shipments as fast as desired. Freights have undergone no change, being on a basis of \$2.25 to Louisville and Cincinnati and \$3 to St. Louis.

Cleveland.

CLEVELAND, July 16, 1888.

Iron Ore.—The total shipments from upper lake ports to date aggregate 1,352,000 tons, against 1,540,000 tons up to a corresponding period last season. These figures do not, however, furnish a proper basis for comparisons, inasmuch as the season of 1888 was fully two weeks later in opening than that of 1887. While there are no reports this week of very large blocks of Ore having been sold, the market has been active, and the aggregate amount disposed of is quite satisfactory. Menominee and Gogebic non-Bessemer have sold with such freedom at \$3.50 that the season's output of many mines has been disposed of. Ore from the Champion and Republic mines, and, in fact, all first-class standard Ores, are still held at \$6 per ton—the price established at the opening of the market in May. Many of the local dealers report that a limit has been reached in the sales of Ore from the mines they represent. Vermillion Bessemer have probably been fully engaged, and it is doubtful if much more Gogebic Bessemer will be offered. Estimates regarding the amount of Ore already sold vary from 3,000,000 to 3,500,000 tons, with the probabilities favoring the lower figures. Vessel rates are firmly established at 85¢ from Escanaba, \$1.10 from Marquette, and \$1.15 from Ashland—a considerable reduction from \$1.50, \$1.75 and \$2.10 rate talked of by vesselmen early in the year. The up cargoes of Coal are very heavy, and ship-owners are not losing any money. Quotations are unchanged at \$5.75 @ \$6 for No. 1 Specular and Magnetic Bessemer; \$4.50 @ \$5 for Bessemer Hematites; \$3.50 @ \$3.75 for non-Bessemer Hematites; \$4.75 @ \$5 for Menominee Bessemer; \$3.50 @ \$4 for Menominee non-Bessemer; \$4.50 @ \$5 for Gogebic Bessemer, and \$3.50 @ \$3.80 for Gogebic non-Bessemer.

Pig Iron.—The market steadily improves. A very satisfactory business in the way of sales has been done during the week. Buyers are purchasing Iron for future wants with a freedom indicative of a termination to the long period of absolute idleness. Bessemer Pig is still the strongest Iron in the local market, bringing from \$1 to \$1.25 more per ton than

was demanded in June. Probably 15,000 tons of Mill Iron have been sold during the week; while Foundry Iron has been inquired for with even greater freedom. Dealers look forward to a settlement regarding prices within the next week, when other than nominal quotations can be given.

Old Rails.—The market is lifeless, no sales of any importance being reported. Old Car-Wheels bring about \$19.50. Axles are in some demand.

Coke.—The price at the ovens is still \$1 7/8 ton, with concessions to large purchasers.

Pittsburgh.

Office of *The Iron Age*, 77 Fourth Ave., }
PITTSBURGH, July, 17, 1888. }

The general industrial situation, so far as this district is concerned, continues in an unsatisfactory condition, and the outlook for an immediate improvement is not favorable. It is stated that there is a good deal of dissatisfaction on the part of the members in regard to the present standing of the Western Iron Association. It is claimed that some of them have acted in bad faith, having accepted the scale of the Amalgamated Association after having agreed with their brethren to resist. It was expected that some of them would sign, being in such a position that they could not very well help themselves, but others, it is claimed, acted in bad faith. Some of the members now threaten to withdraw from the association, while others want to have it reorganized. A forfeit is advocated of say \$10,000 to \$20,000 by each firm belonging to the association.

The great event of the past week was a coal-boat freshet, and the shipment of some 12,000,000 bushels of coal to down-river points, mostly for Cincinnati and Louisville, although a few tows go through to New Orleans. This is one of the largest coal "runs" ever made in July, and was a successful one.

Pig Iron.—There has been no important change in the situation since our last report, but as a number of firms have signed the scale and are expected to start up their mills an increased trade is looked for soon, as consumers, almost without exception, are known to be low in stock, and nearly all of them will have to buy before starting up. However, at present, as but comparatively few of the mills are running, there is not much Pig wanted, and brokers, almost without exception, report trade as being exceedingly dull, but they are hopeful of a change soon for the better, and, as already intimated, their expectations will no doubt soon be realized. The feeling pretty generally obtains that prices have touched hard pan, and furnacemen aver that the next move will be upward. It is generally agreed that there is no margin for profit at present prices, and while the market remains in its present condition there is not likely to be any increase in production. Stocks in first hands are reported light, as nearly all furnaces in blast have contracts and there is not much inducement to start up those now standing idle. Furnacemen say that not for years has the market been in a worse condition than it is at present, and they appear to be pretty confident that it cannot possibly get much worse. Prices remain about the same as a week ago, with the exception that possibly Bessemer is a shade weaker. We quote as follows:

Neutral Gray Forge.....	\$14.00 @ \$14.75, 4 mos.
All Ore Mill.....	15.25 @ 15.75, "
No. 1 Foundry.....	16.75 @ 17.00, "
No. 2 Foundry.....	15.75 @ 16.25, "
No. 3 Foundry.....	15.00 @ 15.25, "
Charcoal Foundry.....	21.00 @ 23.00, "
Cold Blast Charcoal.....	25.00 @ 28.00, "
Bessemer.....	17.25 @ 17.50, "

Muck Bar.—The demand continues light, while prices remain unchanged,

\$26 @ \$28.50, cash. There has been but very little inquiry for several weeks. There are those who would buy on speculation if the price was low enough, but sellers are not any more numerous than buyers at prices quoted.

Manufactured Iron.—Business continues light, notwithstanding the strike; buyers do not appear to be at all apprehensive of anything like a famine, hence, as a rule, they continue to buy only as their immediate wants require. No doubt there will be an increased demand a little later on, but there is nothing in the outlook to indicate any particular activity, although there is reason to believe there will be at least a fair average fall trade. Prices are without quotable change. Bars, 1.70¢ @ 1.80¢; Plates, 2.10¢ @ 2.15¢; No. 24 Sheet, 2.70¢ @ 2.80¢, all 60 days, 2 % off for cash.

Nails.—The Nail trade continues in an exceedingly unsatisfactory condition. Demand is light and prices are unsettled and unremunerative. Manufacturers are refusing to cut card rates, but the fact that they are getting little or no business demonstrates that cutting is being done elsewhere. We continue to quote upon a basis of \$1.90 for 12d to 40d, 60 days, 2 % off for cash, in carlots and upward.

Wrought-Iron Pipe.—The general condition of the market continues exceedingly unsatisfactory, and the outlook is not regarded as being very promising for an immediate improvement. Prices continue so unsettled that they cannot be quoted with any degree of accuracy; some of the mills are standing idle and those in operation are not working up to anything like their full capacity. The great trouble is the lack of oil and natural gas developments as compared with what there was a year ago, when the Pipe mills had a demand for about all the Pipe they could make. There may be an improvement before the winter season sets in, but the outlook at present is not very encouraging.

Old Rails.—The market continues very dull and prices are weaker. We are advised of a sale of 500 tons American at \$20.75. Their is little inquiry. Some of the larger consumers are entirely out of the market, their mills being stopped, and until they are started up buyers in this district are likely to continue scarce. However, the stock of Rails is small and the offerings are light, and some holders appear to be as indifferent as the buyers.

Steel Rails.—So far as we can learn there has been little new business here of late. The Edgar Thomson Works during the past week made some large shipments by river to the Mobile and Ohio Railroad—three barges, containing about 1700 tons. These works are still working up pretty well to their full capacity, turning out from 800 to 1000 tons of Rails per day of 24 hours.

Billets, &c.—There is a continued good demand for Bessemer Steel Billets; nearly all the mills are oversold and some of them are indifferent about taking more orders at present prices, which we continue to quote at \$28 @ 28.50, cash. As to size, quality and delivery, Nail Slabs are still quoted at \$27.75 @ \$28.

Merchant Steel.—There is but little change to note in this branch of trade. Orders continue light, while prices remain unchanged. Tool Steel, 8 1/4¢; Crucible Spring, 4 1/4¢; Crucible Machinery, 5¢; Open-Hearth Machinery, 2 1/4¢. Singer, Nimick & Co. have started up their works with non-union workers, and they appear to be confident of success.

Old Material.—There is a very light demand for all kinds of material, owing to so many of the mills being idle, and prices are weak, but nominally unchanged.

Railway Track Supplies.—Demand continues light, and prices weak, but nominally unchanged: Spikes, \$2 @ \$2.10, 30 days, delivered; Splice Bars, \$1.75 @ \$1.85; Track Bolts, \$2.85 with Square and \$2.95 with Hexagon Nuts.

Cincinnati.

CINCINNATI, July 16, 1888.

Pig Iron.—The improvement in the local Pig-Iron market noted a week ago has continued to grow, and, while the individual sales have not been especially large, the volume of business in the aggregate has been fair, and in some instances furnaces have been enabled to obtain a further advance on prices current two or three weeks ago. Sales have been made of both Foundry and Mill, Coke and Charcoal Irons at prices somewhat in advance of those which could have been obtained at the beginning of the month. There have been no new developments, however, to influence the prices of Iron other than those noted some few weeks since. The improved weather and continued favorable crop reports have imparted a tone of confidence throughout business circles, and Pig Iron especially has reflected this improved feeling. The strike of the Iron-workers is apparently drawing to a close, and the producers of Pig Iron regard it as a feature of special significance, denoting a fair amount of business on hand at the mills, from which they draw the inference that the demand for Pig Iron will be increased in the near future. Most of the Southern furnaces are disposed to contract for little Iron beyond 60 days' delivery, even at an advance of 25¢ to 50¢ 7/8 ton. Buyers, however, are not disposed to make large contracts at present, although they are making more urgent inquiries. The market is still retarded by the amount of off grades for sale, but there is no great pressure to sell even such brands of Iron. About 15,000 tons of No. 2 Southern Mill Iron has been sold on the basis of \$13.25 @ \$13.50 7/8 ton, cash, Cincinnati. Between 3000 and 4000 tons Lake Superior Charcoal Iron has been sold on the basis of quotations. Prices current here, cash, f.o.b., are approximately as follows:

Hot-Blast Foundry.

Southern Coke, No. 1.....	\$16.50 @ \$17.00
Southern Coke, No. 2.....	15.50 @ 16.00
Southern Coke, No. 3.....	15.00 @ 15.50
Ohio Soft Stone Coal, No. 1.....	17.00 @ 17.50
Ohio Soft Stone Coal, No. 2.....	15.00 @ 15.50
Mahoning and Shenango Valley ..	16.50 @ 17.00
Hanging Rock Charcoal, No. 1.....	20.50 @ 22.50
Hanging Rock Charcoal, No. 2.....	19.00 @ 21.00
Tennessee and Alabama Charcoal, No. 1.....	17.50 @ 18.00
Tennessee and Alabama Charcoal, No. 2.....	16.50 @ 17.50

Forge.

Strong Neutral Coke.....	13.50 @ 14.00
Mottled Neutral Coke.....	12.50 @ 13.00
No. 1. Mill Coke.....	13.75 @ 14.00
No. 2 Mill Coke.....	13.25 @ 13.50

Car-Wheel and Malleable Irons.

Southern Car-Wheel.....	20.00 @ 23.00
Hanging Rock, Cold Blast.....	22.00 @ 25.00
Lake Superior Car-Wheel and Malleable.....	20.50 @ 21.50

Manufactured Iron.—Several of the local mills have signed the scale, and a number of others at Pittsburgh have yielded to the Amalgamated Association. It appears to be but a question of time when the Iron-workers will have gained their point. The demand for Bar, Sheet and Structural Iron has not improved materially, however; yet it would seem that a number of mills have contracts which require them to continue operations during the summer, and they cannot afford to remain idle when by paying the previous scale they may continue. There are some mills, however, which are not thus bound, and they are in no hurry to yield. It is claimed that the \$1.50 rate made for Manufactured Bar Iron was only current at Youngstown, the local mills adhering to the card rate as previously quoted: Bar and Sheet Iron—Common Bar Iron, 1.90¢

@ 2¢; Charcoal Bar Iron, 2.90¢ @ 3¢; Sheet Iron, Boiled, Nos. 10 to 27, 2.50¢ @ 3.25¢; Sheet Iron, Charcoal, Nos. 15 to 25, 3.4¢ @ 4.4¢ per lb.

Nails.—There has been a fair jobbing demand, which has been steadily met at prices previously quoted, based upon 12d @ 40d, which sell at \$2 per keg, with 10¢ rebate in carload lots at mills; 50d @ 60d, 25¢; 10d, 10¢; 8d @ 9d, 25¢; 6d @ 7d, 40¢; 4d @ 5d, 60¢; 3d, \$1, and 2d \$1.50 per keg more. Steel Nails sell at \$2 and Steel Wire Nails at \$2.65 @ \$2.75 per keg.

Old Material.—An easier tone has been apparent with moderate sales of Old Rails at \$19.60 per ton, cash, here, at the close. A round lot is offered at \$19.50, with \$19.25 bid. Old Wheels have ruled weaker, with freer offerings and moderate transactions at \$18.90, spot cash.

Detroit.

WILLIAM F. JARVIS & Co., under date of July 16, report as follows: There has been no material change in the Pig Iron market here during the past week, except that a firmer feeling seems to exist among the Lake Superior Charcoal men. A number of large orders have been placed, in some cases for a year's supply, at prices that have ruled for the past three or four weeks, and from the number of inquiries received and the amount required it would seem as if the near future would show a considerable increase both in the number of sales and tonnage for this grade of metal. Ohio and Southern Irons have been quite active, although not as steady as Charcoal Iron. We quote the market to-day as follows:

Lake Superior Charcoal, all numbers.....	\$20.00 @	\$20.50
Lake Superior Coke, all ore.....	19.00 @	19.50
Lake Superior Coke, cinder mixed.....	18.00 @	18.50
Standard Ohio Black Band.....	19.00 @	19.50
Southern No. 2.....	17.75 @	18.25
Southern Gray Forge.....	15.50 @	16.00
Southern Silvery.....	17.00 @	17.50
Jackson County (Ohio) Silvery.....	18.50 @	19.00
Old Wheels.....	19.00 @	20.00

Louisville.

LOUISVILLE, KY., July 16, 1888.

Pig Iron.—There has not been a great amount of business transacted for immediate shipment, though there have been sales in lots of from 300 to 400 tons made of Bright and No. 2 Foundry for future delivery. The disposition to make purchases that will run through the year is increasing, but the prices parties are willing to pay are very low. It is thought that if a conservative policy is pursued by the new furnaces in the South who shortly will have Iron for sale the market will slightly improve, notwithstanding the offering of new Irons, as the consumption of Iron is more than equal to the production at present. It is feared that in some cases the desire to make sales will cause Iron to be offered too low. If, however, prices are not cut, there is no reason why present figures should not be realized and a slight advance take place. There is a strong demand for Foundry grades, also for Mill Irons, which the furnaces are not able to fill. Bright Irons, however, are plentiful. The rolling mills in this vicinity have signed the scale and will resume operations at once.

Southern Coke, No. 1 Foundry.....	\$16.00 @	\$17.00
" " No. 2 ".....	15.00 @	16.00
" " No. 2 1/2 ".....	14.50 @	15.00
Hanging Rock Coke, No. 1 Foundry.....	16.50 @	17.00
Hanging Rock Charcoal, No. 1 Foundry.....	20.25 @	22.25
Southern Charcoal, No. 1 Foundry.....	17.25 @	17.75
Silver Gray, different grades.....	13.25 @	14.25
Southern Coke, No. 1 Mill, Neutral.....	12.75 @	13.75
" " No. 2 ".....	12.25 @	13.25
" " No. 1 " Cold Short.....	12.25 @	13.25
" " Charcoal, No. 1 Mill.....	13.25 @	14.75
White and Mottled, different grades.....	12.00 @	12.50
Southern Car-Wheel, standard brands.....	21.50 @	24.50
Southern Car-Wheel, other brands.....	18.50 @	20.50
Hanging Rock, Cold Blast.....	22.50 @	24.50
Hanging Rock, Warm Blast.....	18.50 @	19.50

New York.

Office of *The Iron Age*, 66 and 68 Duane street, NEW YORK, July 18, 1888.

American Pig.—Deliveries from the furnaces to the consumers continue light, and very little new business is being done by sellers from any quarter. Southern furnaces are supposed to be very well filled up so far as the older concerns are taken into account, one of the leading companies being reported to have 83,000 tons of unfilled orders on their books. Very little is heard in this section from the new plants which have gone in or are about to begin operations. Virginia furnaces appear, however, to be offering Iron in this market on the basis of \$17.50, ex-ship, for No. 1, and reports from Albany state that this class of Iron, as well as some Lehigh and Schuylkill brands, are available there on the basis of \$18 a ton, which is equivalent to \$17.50 at tide-water. We continue to quote: Standard and choice Northern Irons, tide-water delivery, \$17.50 @ \$18.50 for No. 1 Foundry, \$16.50 @ \$17.50 for No. 2 Foundry and \$14.75 @ \$16 for Gray Forge.

Scotch Pig.—We quote: Coltness, \$19.50 @ \$19.75; Summerlee, \$19.25 @ \$19.50; Langloan, \$19 @ \$19.50, and Dalmellington, \$18 @ \$18.50 for large to small lots.

Ferromanganese.—Foreign 80 % Ferromanganese is being freely offered, ex-ship, at \$49.50, with the market in buyers' favor, and the possibility of shading this price somewhat on larger blocks.

Bar Iron.—The market is weak, quotations for carload lots, half extras, on dock, being 1.55¢ @ 1.65¢ for Common Iron, 1.65¢ @ 1.7¢ for Medium, and 1.7¢ @ 1.8¢ for Refined, with special qualities selling up as high as 2¢ @ 2 1/2¢.

Plates.—We quote: Tank, 1.9¢ @ 2¢; Shell, 2.15¢ @ 2.30¢; Steel Tank, 2.4¢ @ 2.15¢; Shell, 2.15¢ @ 2.25¢; Flange, 2.6¢ @ 2.75¢, and Fire-Box, 3¢ @ 3.25¢.

Structural Iron.—We quote: Bridge Plates, 1.9¢ @ 2¢; Universal Mill Plates, 2¢, delivered; Angles, 2¢ @ 2.2¢; Tees, 2.5¢ @ 2.7¢, and Channels and Beams, 3.3¢, on dock.

Steel Rails.—The official report of the Board of Control for the 1st of July shows the sales up to date to have been 934,987 tons out of an allotment of 1,205,000 tons, the deliveries being 585,558 tons. Last year up to the same date the sales were 1,695,055 tons, while the shipments had been 907,351 tons, figures which clearly illustrate the different condition of the Rail trade this year. We may note sales during the week of about 9000 tons in a number of blocks, taken by different mills for Eastern delivery, at private terms. There are rumors of low sales both in the Eastern and Western markets. We continue to quote, however, nominally, \$30 for moderate lots at Eastern mill.

Billets.—During the past ten days there have been sales aggregating about 7000 tons of Low Carbon foreign 4-inch Basic Billets at private terms, the quotation for sailer shipment being \$28.50 @ \$29, ex-ship.

Wire Rods.—Foreign Rods are restricted entirely to the seaboard markets, the only sale of any magnitude reported during the week being one lot of 500 tons at private terms. Reports come from the West that American Billets are being sold as low as \$40 at Pittsburgh, a price which the foreign Rod cannot touch by a large sum. Abroad the market has somewhat receded, German Basic Rods selling at shipping ports at 104/. Freights, however, remain high, sailer rates being 7/6 @ 9/, which steamers command 10/

@ 12/6. We quote \$30.75 @ \$40 for forward delivery, and \$40.25 @ \$40.50 from prompt Rods.

Old Rails.—No business of any consequence is reported. For a lot of 2500 to 3000 tons in the South \$20 has been offered at Philadelphia and refused.

Scrap.—The only transaction reported is a lot of 150 tons of No. 1 Heavy Scrap at \$19, on barge.

Fastenings.—The market continues quiet, with Spikes at \$2 @ \$2.05 delivered and Angle Bars at 1.85¢ @ 1.9¢ delivered.

Metal Market.

Copper.—Since our last week's report Chili Bars have come lower from London, because hereafter contracts for future delivery will include pretty much everything in the way of Refined Copper under the new rules adopted, instead of exclusively Chili Bars, as was the case before their recent adoption. Hence, from £80. 15/- spot, a week ago, they are now cabled £79, and futures have given way from £78. 5/- to £78, but Best Selected improved during the week from £76 to £76. 10/-. Sales for the week 350 tons. Here the market has been moderately active and steady without any feature of interest, sales summing up about 1,000,000 lb, including July at 16.80¢ @ 16.85¢, August at 16.65¢, September and December at 16.35¢ and spot at 16.75¢. The *Boston Transcript* publishes revised tables showing the output of Copper mineral by the nine Lake Superior mines now producing to have been 26,537 tons in the first six months of 1888, against 24,553 tons in the same period of 1887. It points out that despite the decrease of 3014 tons in the Calumet and Hecla output by reason of the fire the aggregate output of the nine mines has increased 1984 tons. The product for the first six months figures up fully 40,850,000 lb of Refined Copper, or 3,000,000 lb increase over 1887. It is estimated, the paper referred to adds, that the product for the year 1888 will be fully 85,000,000 lb, against 70,660,000 lb in 1887 and 79,980,000 lb in 1886. Statistics of Copper in England and France were received by cable yesterday showing an increase of 4000 tons in the visible supply since the 1st inst. The process of withdrawal from English to French stores is, it would seem, still going on, evidently for the purpose of getting advances on the stock held by the syndicate. The total visible supply is now up to nearly 77,000 tons, of which about one-third is in France, against 52,000 a year ago and 62,000 in 1886. The import of American Copper into Liverpool and South Wales the first half year has been 14,322 tons Fine, against 4661 in 1887. Our cable refers to the new method of accepting other than Chili Bars as good delivery on contracts in London. The *Ironmonger* prints the following list of brands classed as "good merchantable" quality: Lake Superior, Baltimore Ingots, Wallaroo Cakes or Ingots, Burra Cakes or Ingots, Arizona Pig, with certificate attached; nothing below 96 % to be delivered. Best Select—Grenfell, Vivian, Nevill, Druce, Bibby, Lambert, C. C. C., Tharsis, Logan, Williams, Foster, Mason, Elkington, Bolton, Baxter, Landore, St. Helens, Roberts, Tough Ingots or Cakes—Grenfell, Vivian, Nevill, Druce, Lambert, Bibby, Tharsis, Williams, Foster, Mason, Elkington, Baxter, St. Helens, Bede, Grange, Rio Tinto, N. G. E. Ingots, Lota Ingots, Urmeneta Ingots. E. & Co., Hope, Lloyd, Mansfield Cakes or Ingots, Japanese Tiles, with certificate attached; nothing below 99 % to be delivered. Electrolytic Copper, with certificate attached; nothing below 98 % conductivity to be delivered. Chili Bars, G. O. B.'s, same condition as now

ruling in London, Liverpool or Swansea; usual warehouse. Each 25-ton lot to be in same port.

Tin.—At the time of our last report the London quotation for spot was £82. 15/, since when an advance to £85. 15/ has taken place, while futures improved from £88. 5/ to £86. the sales in the meantime aggregating 510 tons. The demand in this market has been limited, a moderate trade being done to supply consumption, and speculation being rather tame in spite of the London improvement. Following were the sales effected: 10 tons September, at 18.35¢ before the advance in London was cabled, and 30 tons August, September and October at 19¢ subsequently. In a jobbing way 19¢ @ 19½¢ is obtained at the close. Shipments from the Straits Settlements this way during the first fortnight in July were 150 tons, against 100 in 1887; to England 200, against 500. Since January 1 this way 100, against 2700, and in England 10,200, against 7100.

Tin Plates.—The trade in Tin Plates has not been very active, but owing to the continued light stocks prices of spot Plates have remained unchanged. In futures for August, September and October delivery business has been done during the past week at prices lower than any previously reported. At the close the market is, however, a little firmer, owing to the advance in Pig Tin. We quote at the close, large lines, on the spot, Siemens-Martin Steel, charcoal finish, \$4.75 @ \$5.25; ditto, coke finish, \$4.75; Ternes, \$4.30 @ \$4.40; Bessemer Cokes, \$4.45 @ \$4.55, and Wasters \$4.30 @ \$4.35. Coke Tins are selling at 13/ in Liverpool for prompt delivery.

Lead.—The open market has been drooping, 500 tons selling at 3.95¢, while St. Louis is flat at 3.75¢. On the Metal Exchange 648 tons changed hands from 4¢ to 4.05¢, July and August, down to 3.95¢. In London Soft Spanish was sustained at £12. 12/6, but English Pig gave way from £13. 5/ to £12. 15/.

Spelter.—Common Domestic Spelter has been dull and unsettled at 4.45¢ @ 4.47½¢, while Silesian has been looking up again in consequence of a recovery in London from £15. 15/ to £16. 17/6, and the present quotation is 5¢ @ 5½¢.

Antimony.—The recent decline in the London market to £39 for Hallett has unsettled ours, and we now quote Hallett 9½¢ @ 9½¢, and Cookson, 13¢ @ 13½¢, with a moderate trade doing.

Henry R. Merchant & Co., 2 Metal Exchange Buildings, London, have authorized Mr. Henry Gardner and Mr. Samuel Baer to sign jointly by proxy the name of their firm.

New York Metal Exchange.

The following sales are reported:

THURSDAY, JULY 12.

32 tons Lead, July.....	4.05¢
300 tons Lead, August.....	4.05¢
16 tons Lead, August.....	4.02½¢
32 tons Lead, August.....	4¢
50,000 lb Copper, July.....	16.80¢

FRIDAY, JULY 13.

75,000 lb Copper, December.....	16.35¢
16 tons Lead, July.....	3.95¢
16 tons Lead, September.....	4.02½¢
25,000 lb Copper, December.....	16.35¢
10 tons Tin, September.....	16.35¢
25,000 lb Copper, December.....	16.35¢
16 tons Lead, July.....	3.97½¢
50,000 lb Copper, August.....	16.35¢
100,000 lb Copper, July.....	16.80¢
100,000 lb Copper, July.....	16.80¢
50 tons Lead, July.....	3.95¢

MONDAY, July 16.

10 tons Tin, August.....	18.75¢
75,000 lb Copper, July.....	16.80¢
100,000 lb Copper, December.....	16.35¢
16 tons Lead, July.....	3.95¢
50,000 lb Copper, July.....	16.80¢

TUESDAY, July 17.

50,000 lb Copper, December.....	16.35¢
10 tons Tin, August.....	19.00¢
10 tons Tin, September.....	19.00¢
10 tons Tin, October.....	19.00¢

25,000 lb Copper, December.....	16.15¢
100,000 lb Copper, spot.....	16.75¢
50,000 lb Copper, December.....	16.35¢
48 tons Lead, August.....	3.95¢

Financial.

The general outlook is more cheerful. Crop prospects are further improved and the probability of a foreign demand for surplus grain is strengthened by the latest advices; added to these circumstances is the prospect of renewed activity in the iron industries. The adoption of a free-wool clause in Congress, to take effect January 1, indicates progress on the tariff question. On the Produce Exchange a feature is an advance in wheat, due to stronger cables. Exporters bought more freely. Some of the Western flour mills raised their limits. Corn was easier. The harvesting of early crops in Kansas, Illinois and Southern Michigan has been attended by favorable weather. The Kansas Farmer claims for that State the best wheat crop since 1881, estimating the yield at 22 bushels per acre; corn larger acreage than ever before. The official crop report of the State of Michigan estimates the wheat crop at 15,911,653 bushels, which is less than the crop of last year by 6,811,847, and less than one-half the crop of 1885. Cotton in South Carolina, Alabama and Mississippi, and rice and sugar cane in Louisiana, are greatly improved according to the Government report. Henry Clews attributes the favorable feeling now current in Wall street to the excellent outlook for the crops more than to any other cause that can be named. A good corn crop, Mr. Clews holds, is of vastly more importance than that of any other grain. It is well to observe, however, as a check to undue elation, that the exports of breadstuffs from Southern Russia during the coming autumn are expected to be enormous. The trunk line situation is in a less favorable shape, inasmuch as cuts have been made on new classes of freight. Provisions were cut to 18¢ from Chicago, against 22¢ @ 25¢, the regular rate being 30¢. Live hogs were also dropped to 18¢ from Chicago to New York, 16¢ to Philadelphia and 15¢ to Baltimore, against the normal rate of 30¢, 28¢ and 27¢. Dressed beef was lowered to 6¢ to New York, 4¢ to Philadelphia and 3¢ to Baltimore. The rates on lead and wool were also cut. There is no movement toward a compromise of this trouble.

The Stock Exchange markets have generally been active and strong, but toward the close showed some weakness on realizing sales. The Northwestern situation caused uneasiness. Michigan Central broke down on the announcement that the Duluth, South Shore and Atlantic Railroad has passed into the possession of the Canadian Pacific. The recent action of the Grand Trunk in announcing an advance of rates on dressed beef to 30¢ has been followed by the Nickel Plate and Lackawanna lines, whose new tariff takes effect on the 21st inst. It was also stated that the New York and New England had made arrangements with the Poughkeepsie Bridge Company, whereby it would be enabled to make connections with the Erie and Delaware and Hudson roads. Foreign houses agree in representing that there has been liberal buying of American stocks abroad since the publication of the Government crop reports, confidence having increased. On Monday there were signs of reaction.

The bank clearings of 38 cities last week were \$908,215,328, a loss of 4.5 % as compared with 1887, and outside of New York \$342,088,697, a falling off of 1.9 %. New York decreased 6.2; Philadelphia, 12.5; San Francisco, 16.5; Baltimore, 8.7; Cincinnati, 9.1; Kansas City, 5.8; St. Paul, 18.7; Cleveland, 7.9; Galveston, 22.5; and Topeka, 11.5 %. Boston increased

1; Chicago, 6.8; Pittsburgh, 13.7; New Orleans, 15.9; Detroit, 13.4; Omaha, 28.1; Indianapolis, 15.5; Memphis, 32.5; Norfolk, 27.1; and Duluth, 53.3 %.

United States bonds purchased by the Treasurer under circular of April 17, 1888, amount to \$32,648,038.90. Cost at maturity, \$42,565,933.11. Saving, 4 per cents, \$9,243,325.80; 4½ per cents, \$674,568.41; total, \$9,917,894.21. The fact that bond purchases have dwindled to an insignificant amount causes no anxiety in business, neither does it practically affect the rates of interest. The weekly bank statement showed an increase of \$3,417,600 in surplus reserve, thus recovering the losses of the last few weeks. The excess now is \$27,731,600, which indicates a very strong position compared with one year ago. Loans were contracted \$1,070,200, while specie and legal tenders heavily increased. Money is easy at unchanged rates. We quote short dates, 4 @ 4½ %, but local institutions are inclined to keep their funds well in hand. Commercial paper is in fair supply in settlement of fall purchases, but not equal to the average at this season.

The general markets are dull. Dry good jobbers notice advance engagements for autumn fully a month earlier than usual; prices steady. Anthracite Coal is advanced in price and an early advance in tolls is proposed. In the grocery trade the sensation is a corner in raw sugar by Claus Spreckles as against the trust attended by a simultaneous advance by refineries in New York and San Francisco.

The imports at New York during June, which closed the fiscal year, amounted to \$39,795,650, showing an average far above that of most former years, while the exports for the same month were only \$26,720,292, exclusive of specie, which is the smallest June total for a long period. For the 11 months ending with May the total imports into the United States were \$719,153,390, and the total exports from this country to foreign ports were \$692,119,552, leaving a balance of trade against us of \$27,033,838.

The imports of merchandise at this port last week were valued at \$8,221,000, of which \$2,500,000 represents dry goods. Since January 1 the total imports are \$258,365,000, against \$253,916,000 for the same time last year. The exports for the week were \$5,167,183.

According to the Custom-House report the exports of specie from this port last week were \$2,413,000, making a total since January 1 of \$23,452,900, against \$10,617,000 for the same time last year. The imports of specie for the week were \$16,000; total since January 1, \$5,350,000.

The Bureau of Statistics reports that the value of exports of breadstuffs for 12 months ending June 30 is \$123,298,361, against \$162,427,205 for the year ending June 30, 1887. The total exports of beef and hog products for eight months ending June 30, 1888, \$53,015,029—a decrease of about \$800,000 for the same period of 1887. The total exports of dairy products for the two months ending June 30, 1888, \$1,887,857, against \$2,030,173 for corresponding months of 1887. The exports of mineral oils for year ending June 30 were valued at \$45,150,708, against \$45,423,474 for the preceding year. Exports of cotton for ten months ending June 30, 1888, 4,469,120 bales, value \$212,398,728; for corresponding ten months of 1887 4,271,291 bales, value \$195,744,588.

Coal Market.

The Anthracite Coal trade shows more life, the recent advance having stimulated inquiry and given a stronger tone. The old schedule figures are now fully realized, unless the small steam sizes are excepted, the latter being in excessive supply. Pea

can be bought as low as \$2.40 and Buckwheat \$2 @ \$2.10 f.o.b. Quotations are as follows: Wyoming Free Burning, f.o.b. at South Amboy and Weehawken, Broken or Grate, \$3.85; Egg, \$4.15; Stove and Chestnut, \$4.50. Reading Hard White Ash is advanced 25¢ on Chestnut to \$4.40; 25¢ on Stove to \$4.50; 15¢ on Egg to \$4.25, and 10¢ on Broken to \$4.10—these prices to take effect immediately. Eastern orders are much more plentiful, and large quantities of Coal are going West.

Anthracite Coal production is increasing with the approach of the busy season. The total output for the week ending July 14 is 787,000 tons as compared with 771,000 tons for the week before, and 524,000 tons the week next preceding. Since January 1 the aggregate is 17,736,000, against 17,973,000 for the corresponding period last year. Of the output last week Wyoming contributed 444,000 tons, or nearly half the total. For the month of June, according to the official report, the production of Anthracite was 2,977,000 tons, an increase over last year of 257,000 tons. The stock of Coal at tide-water, June 30, was 741,958 tons, a decrease of 70,000 tons during the month.

Bituminous Coal is abundant at prices which the producers claim yield no profit. A fair trade is in progress.

The Pennsylvania Railroad has carried during the year nearly 6,000,000 tons of Coal, an increase of 608,000 tons compared with last year. The Reading shipped 40,000 tons of Coal to Port Richmond and Elizabethport last week. Vessels are reported in fair supply at Port Richmond, and freights are quoted at 90¢ @ \$1.05, and discharge to Boston. The freights from the Coal shipping ports in New York harbor are quoted at 70¢ @ 95¢ and discharge to Boston.

At Pittsburgh advantage has been made of the recent floods to ship down the river fully 10,000,000 bushels of Coal. Operators in the Southern trade petition the Government to require a 1000-foot span for the bridge at Memphis. Active work looking to the construction of a new railroad to connect the Philadelphia extension of the Baltimore and Ohio Railroad with the Schuylkill Coal region is in progress. The road will be 30 miles in length. The Dunn breaker, at Scranton, owned by John Jermyn & Co., was burned on Tuesday night; loss, \$100,000.

Imports.

The imports of Iron and Steel, Hardware, &c., at this port from July 6 to July 13, inclusive, and from January 1 to July 13, inclusive, were as follows:

Iron and Steel.

	July 6 to July 13, 1888.	Jan. 1 to July 13, 1888.
Pig Iron: Crocker Bros.....	540	6,000
Naylor & Co.....	800	4,275
G. W. Stetson & Co.....	250	11,000
N. S. Bartlett.....	100	3,100
Jas. Williamson & Co.....	100	2,600
Austin B. & Co.....	100	100
Page, Newell & Co.....	13	13
Spiegelstein: Naylor & Co....	466	5,251
J. A. Jansen.....	310	10,352
Crocker Bros.....	98	1,664
Steel: G. Lundberg.....	100	101 1/4
W. F. Wagner.....	80	873
J. Abbott & Co.....	13	263
F. S. Pilditch.....	12	265
R. F. Downing & Co.....	10	177 1/4
A. Milne & Co.....	10	957
Chas. Hugill.....	5	180 1/4
C. F. Boker.....	3	116 1/4
Newton & Shipman.....	3	107
Thos. Prosser & Son.....	2	13
J. Beaver Webb.....	1	1
Steel Rods: Lazard Bros.....	220	497
Naylor & Co.....	206	11,311
H. H. Wolff & Co.....	85	2,395
Baldwin Bros. & Co.....	53	53
Cary & Moen.....	5	559
Iron: J. Abbott & Co.....	190	1,535 1/4
R. F. Downing & Co.....	89	94
W. H. Wallace & Co.....	4	4
E. G. Jacobus.....	1	25
Steel Billets: J. Abbott & Co.	125	1,242
W. H. Wallace & Co.....	26	26
Steel Sheets: Pierson & Co....	56	558
R. Crooks & Co.....	42	267

Naylor & Co.....	38	408
Lalanc & G. Mfg. Co.....	37	442
Steel Blooms: Naylor & Co....	30	1,309
Steel Slabs: A. Milne & Co....	13	67
Naylor & Co.....	10	113
Steel Bars: Union Bridge Company.....	1	259
Steel Forgings: Thos. Prosser & Son.....	143 1/4	2,722 1/4
Steel Tires: Temple & Lockwood.....	2 1/4	2 1/4
Rivet Rods: J. A. Roebbling's Sons.....	188	605
J. Abbott & Co.....	173	2,077
Naylor & Co.....	50	150
Iron Blooms: R. F. Downing & Co.....	5	5
Iron Beams: W. H. Wallace & Co.....	43	254
R. F. Downing & Co.....	4	169
Iron Girders: Lang & Bro....	68	68
Sheet Iron: T. B. Coddington & Co.....	55	708
Screw Rods: American Screw Company.....	70	285
Scrap Steel: A. Milne & Co....	20	77
Wire Rods: J. A. Roebbling's Sons.....	40	86
Iron Rings: Thos. Prosser & Son.....	4	5
Steel Bbl. Hoops: J. S. Leng's Son.....	125	255
Oil Bbl. Hoops: A. R. Whitney & Co.....	200	200
Iron Pyrites: Emerson Foote	750	750
Ferromanganese: Naylor & Co.....	Casks, 42	Casks, 42

Tin Plates.

	Boxes.	Boxes.
Phelps, Dodge & Co.....	15,718	273,759
Pratt Mfg. Co.....	9,607	95,237
T. B. Coddington & Co.....	8,224	88,563
G. B. Morewood & Co.....	3,500	22,439
Dickerson, Van Dusen & Co....	3,379	142,849
H. R. Demilt & Co.....	1,336	8,464
R. Crooks & Co.....	1,075	37,378
N. L. Cort & Co.....	712	58,086
Wolff & Roesing.....	634	17,008
Bruce & Cook.....	525	54,304
S. Shepard & Co.....	375	11,284
J. Byrne & Son.....	200	20,571

Metals.

	Pounds.	Pounds.
Tin: Muller, Schall & Co.....	632,615	5,925,439
A. A. Thomsen & Co.....	11,206	99,603
Spelter: Naylor & Co.....	55,125	251,303
Copper: Lewisohn Bros.....	111,812	111,812

Irons and Metals Warehoused from July 6 to July 13, Inclusive:

	Tons.	Pounds.
Old Steel Rails: Bowering & Archibald.....	200	
Spelter: Naylor & Co.....		55,104

Hardware, Machinery, &c.

Allen & Ginter, Tobacco Knives, cs. 4	
Barbour & Co., Machinery, cs. 5	
Boker, Hermann & Co., Arms, cs. 32; Mdse., cs. 11	
Clark, G. A. & Bro., Mach'y, cs. 48	
Downing, R. F. & Co., Sheep Shears, case, 1	
Field, Alfred & Co., Arms, cs. 47; Mdse., cs. 18; Gun Caps, cs. 16	
Folsom, H. & D., Arms, cs. 28	
Furman, H. C., Arms, cs. 11	
Godfrey, C. J., Arms, cs. 18; do. pkgs., 31	
Hartley & Graham, Arms, cs. 9	
Johnson & Co., Machinery, pkgs., 135	
Lewis & Conger, Hdw., cs. 6	
Lau, J. H. & Co., Arms, cs. 27	
Suthl, Aug., Mach'y, cs. 2	
Lengerke & Dennold, Arms, cs. 2	
Meacham Arms Co., Arms, cs. 24	
Merchants' Disp. Co., Arms, cs. 12; Hdw., cse., 1; do., cks., 10	
Oastler, W. C., Mach'y, pkgs., 11	
Powell & Clement, Arms, cs. 8	
Rotterdam S. S. Co., Arms, cs. 27	
Schoverling, A., Arms, cs. 38	
Sheldon, G. W. & Co., Hdw., cs. 15	
Taylor, Thos., Mdse., cs. 8	
Windmuller & Roelker, Arms, cs. 5	
Webb, J. Beaver, Tire Bars, 16	
Wiebusch & Hilger, Lim., Mdse., cs. 9; Arms, cs. 10	
Witte, John G. & Bro., Cutlery, cs. 6	
Order: Steelware, bds, 215; Ironware, cs. 6; Crank Pin, Forgings, 40; Hdw., cks., 10; Machinery, cs. 1	

Exports of Metals.

	July 6 to July 13, 1888.	Jan. 1 to July 13, 1888.
Copper: J. Abbott & Co.....	38,002	6,238,630
Lewisohn Bros.....		3,879,022
F. A. Lomal.....		2,581,293
American Metal Company.....	100,000	4,442,453
G. H. Nichols.....		223,939
J. Bruce Ismay.....		112,000
S. Mendel.....		560,000
Ledoux & Co.....		110,278
Muller, Schall & Co.....		430,000
Copper Queen Con. M. Company.....		224,034
J. Kennedy, Tod & Co.....		112,028
H. Becker & Co.....		1,250
Orford C. & S. Rfg. Company.....		224,881
Robt. M. Thompson.....		125,000
Thos. J. Pope, Sons & Co.....		765,880
J. Parsons & Co.....	138,750	206,250
Bridgeport Copper Company.....		112,000
C. Herold.....		250,000
Phelps Bros.....		6,250
R. W. Jones.....		189,984
Copper Matte: Williams & Terhune.....	1,080,835	80,994,740
Lewisohn Bros.....		3,021,610

American Metal Company.....	1,272,563
J. Abbott & Co.....	245,000
C. Ledoux & Co.....	485,000
F. W. J. Hurst.....	184,288
G. H. Nichols.....	722,777
H. T. Nichols & Co.....	180,965
Old Brass: Burgess & Co.....	1,382
Old Copper: Burgess & Co.....	21,061
	483,014

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, July 18, 1888.

The Block Tin market has been quite active again the past week, and governed almost wholly by speculative manipulation under the guidance of operators supposed to be working in the interest of producers. Consumers have a considerable supply on hand, and quite liberal amounts due on purchases of three months' contracts made some time ago. This fact and the accumulation of supplies at primary points encourage "bear" operations to some extent. The producers and their allies continue to hold supplies back to greater or less extent, however, and take the aggressive in the speculative market, presumably trusting that the "short" sellers will ultimately experience difficulty in covering their contracts without forcing prices higher. In any event it is certain that all attempts to depress prices are stubbornly resisted. Prices are now £3 @ £4 higher than a week ago.

The most interesting feature in the Copper market has been the working of the new form of contracts involving deliveries of other brands, equal to or better than Chili Bars. The previous opposition to the innovation seems to have completely died out, and the syndicate have been liberal purchasers under the new form of contracts. This, in turn, has served to improve prices, and the market shows better tone at the present time than a week ago. However, the breaking off of the late agreement between the English associated smelters and the continued transfer of large blocks of Chili Bars from England to France is not without prejudicial effect upon outside speculation.

The transactions in Copper furnace material continue to be on a small scale and at not particularly firm prices. Messrs. James Lewis & Sons' report, of 15th inst., notes a sale of 35 tons American Matte at 13/9 p unit, the first transaction in that class of material for six or eight weeks.

The demand for Tin Plate has been limited, and those buyers who manifest any disposition to take hold insist upon prices lower than have been accepted at any time since June 1. Sellers are firm, however, in view of the tone of the Block Tin market and some appearance of improvement in Pig Iron prices. The production is now on a very liberal scale, but stocks show no remarkable increase. The total at British shipping points is now 226,000 boxes, against 204,000 boxes a year ago, and about 195,000 boxes on January 1.

The Scotch Pig Iron market is affected in a degree by speculative operations governed in a good measure by outstanding engagements. The latter, together with a better demand from consumers for makers' brands, impart more or less firmness to values. Hematite warrants are held largely by merchants who purchased freely some time ago, when prices were at a very low

point. Present indications point to large consumption the balance of the year, and it is the popular idea that the requirements will be sufficient to cut the stocks down at the rate of 1000 tons per week. Producers are encouraged by the more cheerful aspect and sell reluctantly at current prices.

In several departments of the Steel trade a brisk demand is reported, and makers are, in some instances, in arrears with deliveries on back orders. However, work is not as large in some branches as could be desired, and prices consequently are somewhat uneven. Messrs. Bolckow, Vaughan & Co. have secured a large order for Steel Rails involving about 49,000 tons. The terms are not made public.

The reports from the meetings are generally to the effect that a good business was done.

Morewoods' "Lion" Galvanized-Iron Works, Birmingham, have been sold for £10,000 sterling.

Scotch Pig.—Maker's brands steadier in sympathy with "warrants," but the market quiet.

No. 1 Coitness, f.o.b. Glasgow	47 6
No. 1 Summerlee	47
No. 1 Gartsherrie	44
No. 1 Langloan	44 6
No. 1 Cambro	39 6
No. 1 Rhoda	45
No. 1 Glenarnock	43
No. 1 Dalzellington	40
No. 1 Eglinton	38 6
Steamer freights, Glasgow to New York	5/
Liverpool to New York	7/6

Cleveland Pig.—The market very firm and fairly active. No. 1 Middlesboro', G.M.B., 34/6; No. 3 do., 32/

Bessemer Pig.—Business very fair and the market steady. West Coast brands, mixed numbers, 43/, f.o.b. shipping point.

Spiegeleisen.—Prices firm and the demand good. English 20 % quoted 80/, f.o.b. N. W. England shipping point.

Steel Rails.—A good business doing at steady prices. Standard sections quoted at £3. 17/6, f.o.b. at N. W. England shipping point.

Steel Blooms.—The market quiet and unchanged. We quote at £3. 13/6 for 7 x 7, f.o.b. at N. W. England shipping point.

Steel Billets.—The market steady, with very good demand. Bessemer, 2½ x 2½ inch, £3. 17/6, f.o.b. at N. W. England shipping point.

Steel Slabs.—Values are easier and the demand slow. Bessemer, £3. 18/6, f.o.b. at N. W. England shipping point.

Steel Wire Rods.—Market still weak and dull. Mild Steel No. 6 quoted at £5. 10/ and No. 5 at £5. 7/6, f.o.b. at N. W. England shipping point.

Old Rails.—Demand light and prices barely steady. Tees quoted at £2. 15/, and Double Heads £2. 17/6, c.i.f., New York.

Scrap Iron.—Market dull and rather weak. Heavy Wrought quoted at £2. 5/ @ £2. 7/6, f.o.b.

Crop Ends.—Market dull and unchanged. Bessemer quoted £2. 5/ @ £2. 7/6, f.o.b.

Tin Plate.—Prompt deliveries firmer, with slight advance paid for Bessemer Cokes. We quote, f.o.b. Liverpool:

IC Charcoal, Allaway grade	14/6 @ 15/
IC Bessemer steel, Coke finish	13/ @ 13/3
IC Siemens	13/3 @ 13/6
IC Coke, B. V. grade	12/9 @ 13/
Charcoal Terne, Dean grade	12/6 @ 12/9

Manufactured Iron.—There has been more business, and the market is firmer. We quote, f.o.b. Liverpool:

Staff, Ord. Marked Bars	£ s. d. 7 10 0
Common	4 17 6 @ 5 0 0
Bl'k Sheet, singles	6 12 6 @ 6 15 0
Welsh Bars (f.o.b. Wales)	4 12 6 @ 4 15 0

Tin.—There has been a lively business, and the market is very firm. Straits quoted at £85. 12/6 @ £85. 15/, spot, and £86 @ £86. 5/ for three months' futures.

Copper.—Trading has been larger at rather lower prices for prompt deliveries. Chili Bars closed at £79 @ £79. 5/, spot, and £78 @ £78. 6/, three months' futures. Best Selected, £75, nominal.

Lead.—The market easier, with only a moderate business. Soft Spanish, £12. 10/ @ £12. 15/ at the close.

Spelter.—Demand has continued good and prices have further advanced. Silesian, ordinary, £16. 5/ @ £16. 10/ at the close.

Mayor Hewitt has issued a card to the public in which he called attention to the case of O. M. Hartt, the foreman of a shoe factory, who had discharged a man for theft and whom the Shoemakers' Union demand should be taken back. The Mayor says: "For 18 months Hartt has been kept out of employment, and in the meantime has been compelled to assert the doctrine of the liberty of the citizen under circumstances peculiarly discouraging. At length the law is settled, but Hartt in fighting your battles is out of pocket, as he informs me, to the amount of \$2500. For this loss he can get no redress, and the men who have caused it have been discharged by the court from punishment, while their victim, with a family of seven children, has been reduced to poverty. I have been familiar with the circumstances from the beginning and am convinced that a wrong has been done which can only be righted by the spontaneous action of the public. I would prefer that the contributions be small in amount, but general. I fear, however, at this season of the year that it will be difficult to raise the sum proposed, and hence I will head the subscription with the sum of \$100. Subscriptions will be received and acknowledged by Abram S. Hewitt."

Petitions numerously signed have been presented in the Senate from the St. Paul Chamber of Commerce, and from cannery and packers of Baltimore, Cleveland and Portland, Ore., praying for the repayment in full of duties paid on imported tin plates when made into cans and exported, containing American products.

Work has been resumed at the Belvidere mines, in New Jersey, after a suspension of several weeks. A large force of men are engaged in sinking new shafts. The outlook for steady work is encouraging. The company has a large quantity of iron ore on hand.

We have received a number of samples of the different alloys of metals produced by E. W. L. Biermann, of Hanover, Germany.

The product of the Tamarack Copper Mine for the year ending June 30, 1888, is estimated at 10,390,000 pounds. At a net profit of 6 cents per pound this would yield \$623,400.

Frank Wilkeson, a peripatetic correspondent, has sent to the New York Times a most wonderful review of the history of the American iron trade and of the present cost of mining ore, making pig iron and

manufacturing rails in the United States. We need only state that he places the cost of Lake Superior Bessemer ore at \$2.50 at Lake Erie ports, and with Connellsville coke at \$1.75 at furnaces, then gets Bessemer pig at \$7.88 in Ohio. According to our authority "good pig iron loses about 10 per cent. in weight in being transformed into Bessemer steel;" hence by some mysterious figuring the material to make steel ingots in Ohio costs \$6.59, making the total cost, with labor at \$2.50 and other expenses at \$1.95, as low as \$10.04. The conclusion is that steel rails can be made on Lake Erie for less than \$25. Let the Hon. William Scott, of Erie, retire as an expert.

The President has approved the acts for the construction of bridges as follows: A railroad bridge across the Ouachita River, Ark.; a railroad bridge across the Columbia River, between Oregon and Washington Territory; a railroad bridge across the Red River of the North; bridge across the Mississippi River, near Oquawka, Ill.; bridge over the Tennessee River, between Bridgeport and Sheffield, Ala.; bridge over the Caney Fork River, between Rock Island and Carthage, Tenn.; bridge across the Mississippi River, near Clinton, Iowa; bridge across the Tombigbee River, in Alabama; bridge across the Mississippi River, near Muscatine, Iowa; railroad bridge across Bayou d'Arbonne, La.; bridge over the Missouri River, near Nebraska City, Neb.

The new gas well near Canonsburg, Washington County, Pa., is reported to be the largest in the world, if judged by the registered pressure. Solid masonry, 12 feet thick, was put in around the top of the well to hold the cap on. The tools and rope thrown out were, perhaps, the heaviest of any yet moved in that way. The iron in the tools weighed 3000 pounds, the wet rope, nearly 2000 feet long, weighed as much more, but all was thrown up like a rocket, the rope coiling around the ruin of the derrick like so much yarn.

The Government of New Zealand has proposed a new tariff bill which will considerably diminish the free list and increase small ad valorem duties. The class of goods affected principally are such as can be exported from the United States, and includes machinery, cotton and woolen goods, boilers, ironware and manufactured carriages and wagons.

The *Railway Age* prints the following: The aggregate of track laid during the past six months now proves to be actually greater than has ever been reported in the same period with the exception of last year, when our record for the first half showed 3754 miles laid, the total for the year reaching almost 13,000 miles. Our detailed record shows that between January 1 and July 1 of the present year 3320 miles of main line—not including sidings—was laid in the United States. This mileage is divided among 168 lines, and indicates what is to be a characteristic of railway construction this year—that it will be made up by the building of a great number of comparatively short roads, instead of being composed to a large degree of long lines built by a few companies.

The United States cruiser Charleston, which is being constructed at the Union Iron Works, at San Francisco, will be launched July 19.

The Customs Department of Canada in June rendered a decision placing bronze wire on the free list, while it made the rate of duty on wire window screens 35 per cent.

Hardware.

During the past week the market has been quiet and dull, the demand being small and prices continuing in most lines without important change. Manufacturers and merchants are pursuing a conservative course and avoiding overstocking. While the market is thus not as strong and active as might be desired, the eminently satisfactory condition of things throughout the country at large is to be borne in mind, with the prospect of at least a fair fall trade.

Barb Wire.

Prices in this market are nominally unchanged, but with the limited demand and the condition of the business in the West manufacturers would probably be disposed in some cases to shade quotations if necessary to meet the views of their customers. Regular quotations are as follows: Carload lots, 4 cents; 3-ton lots, 4.15 cents, and small lots, 4.30 cents.

The Braddock Wire Company, Rankin, Pa., St. Louis office 821 South Twenty-first street, announce that in the suit of the Washburn & Moen Mfg. Company and I. L. Ellwood against them the complainants withdrew, July 2, their motion for injunction. Referring to this matter the Braddock Wire Company and the St. Louis Wire Mill Company advise us as follows:

The Washburn & Moen Mfg. Company and I. L. Ellwood & Co. have about ten suits for infringements of Barb-Wire patents pending against the St. Louis Wire Mill Company and the Braddock Wire Company, and most of these suits are in the Eighth Judicial District, of which Judge Brewer, of Leavenworth, Kan., is circuit judge. He is the only United States judge who sustained the Glidden patent. The St. Louis Wire Mill Company are ready and willing to stipulate to go to trial before this identical judge, who formerly sustained the original Glidden patent, on 90 days' notice. We think if they have any patents which they think are valid they would certainly prefer to take their chances before the only judge who ever sustained them, and we therefore make this proposition, which will be good if accepted within 30 days.

Cut Nails.

Buying continues only from hand to mouth, and chiefly in small lots. There is still some irregularity, which, however, it is stated affects only those brands which are not recognized as standard. We continue to quote \$1.90 to \$1.95 for carload lots on dock and \$1.95 to \$2.00 for small lots from store. The feeling in the trade here is that the chances of securing anything like general adhesion to a Nail pool among Eastern manufacturers are very slight indeed.

Miscellaneous Prices.

The recent action of the manufacturers of Carriage Bolts in reducing their prices is generally regarded as having been a wise move in its bearing toward the discouragement of outside competition, and also in keeping the goods at a comparatively low price, yielding a fair but not exorbitant profit. In this respect they have avoided the mistake into which similar organizations of manufacturers frequently fall. At the same time the material reduction in price and the narrowing of the margin for the jobbing trade have been regarded by them with some disfavor, and some of the wholesale houses, especially those who had recently purchased additional Bolts, so as to get the quantity discount, are disposed to complain of the hardship of the situation, particularly in view of the fact that their margin of profit on the goods is here-

after to be narrower than it was. This latter feature of the case is, however, referred to by the manufacturers as necessitated by the fact that the jobbers throughout the country were in most cases underselling the manufacturers, giving away a portion of their rebates.

The market for Augers and Bits is in a very good condition and is characterized by more regularity than usually prevails in this line. Extreme prices have been withdrawn and the goods are held at somewhat higher figures, the market continuing steady and firm. The fact that the business of William A. Ives & Co. is being carried on conservatively by Mr. Ives' executors has its bearing on the tone of the market.

The manufacturers of Cast Butts have been conferring with reference to prices and considering the feasibility of reaching an understanding which will secure regularity in this line of goods. We are not advised that anything definite has been accomplished in this direction.

The Clark Mfg. Company, Buffalo, have announced the following revised discounts for Clark's Surface Blind Hinges and Gate Hinges and Latches:

	Per cent. discount.
Blind Hinges.....	75, 10 and 5
Gate Hinges and Latches.....	60, 10 and 5

They state that they can furnish either "Old Pattern" or the "Tip Pattern" Blind Hinge. The following price list is appended:

	Per doz. sets.
Nos. 1, 40 and 50.....	\$3.50
Nos. 3 and 45.....	6.25
No. 5.....	12.50

The manufacturers of Nuts are announcing the new price of 5½ cents off list, which went into effect July 1.

With the recent changes which have taken place in Oakum, we revise our quotations as follows:

Government.....	per pound, 8 cents
U. S. Navy.....	per pound, 7 cents
Navy.....	per pound, 6 to 6¼ cents

The general features of the market on Wrought-Iron Pipe continue as at our last report. Manufacturers are holding to the advanced quotations, and the market is characterized by firmness with a fair demand.

Since our last report there has been an advance of ¼ cent in the price of Sisal Rope, making an advance of ½ cent within a short time. The stock of Sisal Hemp is reported to be exceptionally low with no prospect of any great increase in the supply until the new crop comes in. For this reason the market is regarded as exceptionally firm.

Tinware is selling at somewhat irregular prices, and dealers who have not recently received revised quotations from manufacturers will do well to look into the market carefully. There has not been a material change in price, but the tendency is toward somewhat lower figures than those which prevailed some time ago. Net prices are frequently made lower than those generally given by a discount from the list.

Goulds & Austin, Chicago, Ill., issue a postal calling attention to the Imperial Hose Reel, which they offer at 60 cents. They also quote Competition Hose, ¼ inch, at 4½ cents per foot.

The market for Tacks is in a decidedly unsatisfactory condition for the manufacturers, competition continuing very active, and exceedingly low prices being in some cases made. At some of the quotations which are current it is a question whether the manufacturers can supply the goods without materially scrimping the weight, and it will be well for the trade to look into the weights of any Tacks they pur-

chase. The frequency with which short weights are supplied is one of the features of the Tack market which must be borne in mind by the careful buyer.

The E. C. Meacham Arms Company, St. Louis, Mo., are making the following quotations on 10 M assorted lots of the goods named:

Cartridges, 45-70, 500-Grain Bullet, Copper Shells, U. S. Gov't make, outside Winchester Primer, per M., at.....	\$22.00
The New Winchester 45-70 Model, 1888, will take the U. S. Cartridge 45-70, 500-grain Bullet, and do better work than with any other Cartridge.	
Cartridges, 50-70, Brass Shells, Winchester make, per M., at.....	\$20.00

Firearms.

Hartley & Graham, 17 and 19 Maiden Lane, New York, have issued, July, 1888, a price list of Guns, Revolvers, Ammunition and Sporting Goods, with quotations to the trade. It is a well printed and well arranged pamphlet of 44 pages, in which many leading Arms are illustrated, with list prices and discounts or net figures. The list of Ammunition is also given, without quotations, however, and with an intimation that discounts will be furnished on application. Some specialties in the same line are also shown. As representing a very complete line of these goods, and giving some interesting quotations, the price list will be appreciated by the trade.

The E. C. Meacham Arms Company, St. Louis, Mo., have sent out very widely to the trade the following quotations on Firearms, in which it will be observed that some specially low prices are quoted. It is stated that only the quantities named will be furnished at these prices:

25 Remington Floberts, P. Grip, Light 22, No. 2, at.....	\$2.30
25 Remington Floberts, P. Grip, Heavy 22, No. 3, at.....	2.75
25 Warrant Floberts, P. Grip, Light 22, No. 4, at.....	2.65
25 Warrant Floberts, P. Grip, Heavy 22, No. 5, at.....	3.50

Case Lots, B. L. Single Guns.

Semi-Hammerless, 12-gauge, \$8.50; 10-gauge, at.....	\$10.50
XL Shot Guns, 38, at 85; 44 at.....	6.00
Remington System, 20-Gauge, 30 inch, at.....	5.50
Case Lots, Zulu, 12-Gauge, at \$2.65; 100 lots at.....	2.50
Springfield, 16-Gauge, 32-inch, at.....	4.50
Champion, Side Snap, 12-Gauge, at \$6.50; Twist, 12-Gauge, at.....	7.25
Champion, Top Snap, 12-Gauge, at \$7.50; Twist, 12-Gauge, at.....	8.25
Champion, Side Snap, 10-Gauge, at \$5; Twist, 10 Gauge, at.....	5.50
Champion, Top Snap, 10-Gauge, at \$6; Twist, 10-Gauge, at.....	6.50
H. Richards, Top Snap, 10-Gauge, at.....	7.00
Forehand & Wadsworth System, 10-Gauge, \$7.50; 12-Gauge at.....	7.00
Champion, Hammerless, P. G. P. F., Rubber Butt, 12-Gauge, at.....	6.50
Champion, Hammerless, P. G. P. F., Rubber Butt, 10-Gauge, at.....	6.50

25 Lots B. L. Double Guns (Assorted).

No. P., Lefauchaux, 12-Bore, at \$5.95; 10-Bore at.....	\$5.90
Bonehill, No. 28 E, 30 to 32, Choked, at.....	17.00
Bonehill, No. 36 E, 30 to 32, Choked, 10-Bore only, at.....	18.00
1023, English, Side Snap, Back-Action, 10 and 12-Gauge, at.....	8.75
1180, Same Reb. P. G., 12-Gauge only, at.....	9.50
English Side Snap Bar, 10 and 12-Gauge, at.....	10.75
English Top Snap, Bar-Action, Reb. P. G., 10-Gauge, at.....	11.50
English, Top Snap, Bar-Action, Reb. P. G., Ex. Rib., 10-Gauge only, at.....	13.50
International Top Snap, Back-Action, \$14.85; Bar-Action at.....	18.85
International Side Snap, Laminated, Pistol-Grip Rebounding, at.....	9.85

100 Ass't Dbl. Act'n Plated Revolvers.

Net Cash.	
44 C. F. British Bull Dog, Wood, American make, at.....	\$1.25
32, 38 and 44 American Bull Dog, at.....	1.50
32, 38 and 44 Imported British Bull Dog, at.....	1.40
32 and 38 XL Bull Dog, Regular Hammer, at.....	1.60
32 and 38 XL Bull Dog, Folding Hammer, at.....	2.20

41 Remington Double Derringers, at.....	4.05
32, 38 and 44 F. & W. British Bull Dog, Rubber and Reb'dg, at.....	1.70
32 and 38 Forehand & W. Automatic, at.....	5.50
38 American Arms Co., Single Action Shell-Ejecting, at.....	3.00
38 American Arms Co., Double Action, Shell-Ejecting, at.....	4.00

Straight Grip New Guns.

5 Parker Bros.' 10-Bore, 32-inch, 10 to 10½ lbs. List, at \$55; Net, at.....	\$27.50
5 Colt's 30 and 32-inch, 12-Bore, 7¾ to 10 lbs., 10-Bore, 8 to 10½ lbs. List, at \$50; Net, at.....	27.50

Case Lots Single M. L. Guns.

No. 3, Davis System, 32 to 34-inch, at.....	\$2.75
Model '42 Muskets, at.....	1.50
Model '58 Cut-Down Blued, at.....	1.75
Model '82 Blued, at.....	2.00

Will Sell in Case Lots as follows:

10 Spencer Repeating Shot Guns, at.....	\$25.00
20 Springfield Rifles, 45-70, Wind-Gauge Sights, at.....	9.00
20 Springfield Military Rifles, 50-70, with Bayonet, at.....	5.50
20 Sharps Borchardt Military, 45-70, Re-finished as new, at.....	6.50
20 Springfield Rifles, 45-70, with Bayonet, at.....	6.00
20 Whitney-Kennedy Rifles, Octagon, 40-60 and 45-60, at.....	8.75
10 Sharps Sporting Rifles, '74 Model, 45-70, 30 in Oct., D. T., at.....	9.00
50 Flobert Rifles, Extractor on Barrel, B. Cap, at.....	1.50
10 Remington Guns, '82, 10-Bore only, 30-inch, 8½ lbs, at.....	20.00
80 Bags Shot, Patent, at \$1.15; Chilled, at.....	1.40

Items.

A meeting of the National Association of Carriage and Wagon Axle Manufacturers was held in the Monongahela House, Pittsburgh, on Wednesday, the 11th inst., President B. L. Sheldon presiding. The reports of some committees were read, and careful attention was given to reports as to the general condition of the trade and other matters of interest to the association. The following officers for the ensuing year were chosen: President, B. L. Sheldon; first vice-president, F. W. Wooster, of Brooklyn; second vice-president, G. H. Laughlin, of Cleveland; third vice-president, N. G. Park; treasurer, G. F. Smith, of Fort Plain, N. Y.; secretary, J. C. Lee, of New York.

A wholesale department has been opened at Nos. 11 & 13 South Canal st., Chicago, by the American Well Works, of Aurora, Ill. A stock of their own goods will be carried, and in addition a full line of Iron Pipe, long Couplings, plugged and reamed Pipe for Tube Wells, Artesian Tubing and well supplies generally.

The Grand Rapids Refrigerator Company, of Grand Rapids, Mich., have issued a circular in which, among other things, they call the attention of the trade to the fact that owing to the great number of houses in which steam heat is being placed there is a much greater demand for Refrigerators during the fall and winter than formerly. The capacity of their new factory is now 100 Refrigerators daily. It will be run to its full capacity during the summer, fall and winter to accumulate stock, so that prompt shipments can be made in the future. Their assortment of Refrigerators is now complete.

The National Carriage Spring Manufacturers' Association held a regular meeting at the Monongahela House, Pittsburgh, on Wednesday, the 11th inst. E. H. Bourne, of Cleveland, was chairman, and G. S. Smith, of Fort Plain, N. Y., acted as secretary. There was an unusually large attendance, members being present from all over the country. In contrast with the Axle manufacturing business, the trade in Springs was reported to be in a very favorable condition. It is not only good at present, but the outlook is very encouraging. The advisability of merging the organization into the National Carriage Builders' Association was discussed. It was unanimously decided to go into the general association. A committee of three

was appointed to attend to the preliminaries necessary to the consolidation. The committee was composed of E. H. Bourne, of Cleveland, president of the National Carriage Spring Association; G. S. Smith, of Fort Plain, N. Y., and E. R. Irwin, of Pittsburgh.

The Chicago Wire and Spring Company, 154 Lake street, Chicago, now own and operate the works of the late Grant Wire and Spring Company, at Lockport, Ill. They manufacture Tinned and Spring Wire, but devote special attention to the production of Upholsterers' and Cabinet-Makers' Springs, finding the best outlet for their works in that direction. They aim to produce a high quality of goods and find their efforts are appreciated. The demand has so greatly increased that they have been obliged to put more machinery in their Spring department this month to enable them to fill orders with reasonable promptness. Millard R. Powers is president and J. C. Reynolds is secretary and treasurer of the company.

The trade will observe the advertisement on page 63 relating to Peter Wright's Anvils and calling attention to an imitation of their brand, against which the trade are cautioned.

The Todd-Donigan Iron Company, Louisville, Ky., have issued a very convenient and creditable catalogue, the first published since the organization of the company in 1881. It relates to supplies for mines, railroads, machinists, quarrymen, blacksmiths, boiler-makers, wagon-makers, fence builders, carriage-makers and railroad contractors, which are appropriately classified and fully illustrated in a substantially bound volume of 337 pages. It is evident that care has been taken in the preparation of the illustrations with a view to securing quality and effectiveness. Many of them, we are advised, were prepared especially for this volume, and made in Louisville, where also it is interesting to observe the fine paper of the volume was manufactured, the printing, binding, &c., being all done in that city, to which the excellence of the workmanship is very creditable. The large line of goods represented in the volume are carried in stock; some of them, such as Turn Buckles, Wire Rope Fastenings, Wire Rope Clamps, &c., as well as those goods shown on pages 63 to 75, including Hoisting Machinery, Derrick Castings, &c., are not kept in stock by other houses in that section.

In their advertisement on page 71 the Jetter Mfg. Company, Buffalo, N. Y., call attention to their goods, including Files, Screw-Drivers and Wrought Goods.

Horton, Gilmore, McWilliams & Co., Chicago, Ill., under date July 15, have issued a 16-page price current, in which they represent a line of Tin Plates, Metals, &c., Tin Shingles, Freezers, Water Coolers, Window Screens, Bicycles, Campaign Torches and other goods.

Our readers will observe the Special Notice on page 49, in which a gentleman of long experience in the Wholesale Hardware and House-Furnishing business announces, under the *nom de plume* "Energy," his desire for a position in this city or elsewhere. His qualifications are referred to, and the fact that the best references can be furnished.

Whitfield & Jacobs, Pontiac, Mich., manufacturers of the Buckell Safety Clevis, advise us that they have recently made a great improvement in the appearance of their Clevises by giving them a handsome coat of japan. They are also furnishing to dealers who desire them a well-finished sample board to hold one each of the different sizes of their Clevises. They are made in easel form to stand on the counter or floor, are painted bright red

and varnished, and when furnished with the Japanned Clevises are said to be very attractive in appearance.

Carl F. Boker, 93 John street, New York, announces that Asbeck, Osthaus, Eicken & Co., Hagen, Germany, have placed in his hands the sole agency for the United States and Canada for their Steel Music Wire for pianofortes and springs. This Wire is referred to as well known for its superior quality. Mr. Boker states that he keeps a large stock on hand for springs, which is especially manufactured for this purpose. His circular also states the sizes in which Wire is made.

The American Screw Company, Providence, R. I., send out in very neat form a sample of their new rolled Screw. One of the new Screws and one of the old are inserted in wood, which is cut open to show the manner in which the two Screws enter the wood. They call attention to the superior point of the new Screw, which enters the wood easily, to its deep thread, giving greater holding strength, and to the small shank, which avoids splitting the wood, and requires but one boring for hard wood.

As appears by the advertisement on page 69, it will be seen that Wm. H. Caldwell is successor to the Andrus Mfg. Company, Rochester, N. Y. In carrying on the manufacture of the interesting Hardware specialties formerly made by that company Mr. Caldwell will have the best wishes of the trade for his success.

Walter Hart, 65 Stone street, New York, issues a circular devoted to the National Flagstaff Bracket, which shows the separate parts and the use of the Bracket. By the announcement on page 49 it will be seen that Mr. Hart calls attention to these Brackets, and his desire to make arrangements with houses in the principal cities to handle the goods.

An interesting game of base-ball took place at the Prospect Park base-ball grounds last Saturday between the employees of Wm. Bryce & Co. and H. L. Judd & Co. The game was well played by both clubs. The result was the latter were vanquished, the score being Wm. Bryce & Co., 7; H. L. Judd & Co., 6.

W. B. Barry Saw and Supply Company, Indianapolis, Ind., have issued their catalogue and price list for the current year. It is a conveniently arranged pamphlet, which represents their line of goods, with mention of related specialties and tables for reference. The company call attention to the fact that some important changes have been made in prices, and that some valuable additions have been made in the line of Saw Tools.

E. K. Sargeant, Brockville, Ont., issues a circular relating to Sargeant's Process Coffee Pot and Urn, which was patented in Canada March 31, 1886, and in the United States May 1, 1888. Besides the ordinary line of Coffee Pots made on this principle the circular describes large Coffee Machines for making from 11 to 20 gallons at a time.

Worcester Ferrule Company, Worcester, Mass., have obtained a patent for improvements in Knobs for dampers or registers, the object of the invention being to produce a Knob which will cause the slide to which the Knob is attached to fit more closely to the door. This is accomplished by means of a coiled spring bearing at its opposite ends against the nut and the inner face of the cap plate.

The Cincinnati Wire Company, Cincinnati, Ohio, have issued their standard price list No. 2, which contains the card for Standard Wire Nails, and also the Miscellaneous Wire Nail list, with the memoranda of extras which we referred to in our last issue as decided upon by the manu-

facturers. The whole is conveniently arranged, and will be appreciated by the trade. In the circular accompanying it the company call attention to the fact that their factory is equipped with the most modern machinery, and manned by the best class of nailers, and has a capacity of 600 kegs per day.

The Henry C. Hart Mfg. Company, Detroit, Mich., have issued a catalogue of specialties for the Toy trade. It includes Safes, Savings Banks, Toy Cannon, &c. The Cash Register Bank is an interesting and recent addition. It has a device for registering the amount of cash contained in the Bank.

On the 2d inst. the partnership heretofore existing between F. D. Butterfield and H. S. Haskell, under the name of Butterfield & Co., Derby Line, Vt., was dissolved by mutual consent. The manufacture of Stocks, Dies and Taps for blacksmiths', machinists' and steam fitters' use will be continued by F. D. Butterfield and F. G. Butterfield under the same style as heretofore, they having succeeded to the business of the late firm.

Trade Topics.

With reference to uniformity in marking goods, as advocated in the letter of a correspondent in a recent issue, we have the following from a Missouri Hardwareman:

I noticed an article in your paper on uniformity in marking goods, which seems to me looks well on paper. It is, however, mighty hard to lay down a cast-iron rule to sell by. No doubt your correspondent has reference to running the business in a city of some size, where a cash trade is possible. But what rule would he advocate for the country merchant who not only does not sell for cash, but all the way from one to six months' time, or longer? Now if we make a cast-iron rule and charge our cash customer the price marked on the goods, what shall we do with those who settle up twice or three times a year? It will not do to charge them a little more on every article that we sell, for they would object. How is this to be regulated? Or if we were to increase the margin, so as to take in our six months' customer, would that be doing justice to the man who paid us in 15 or 30 days? Or, supposing a customer comes in who sometimes pays cash and at other times does not and asks for a certain article, and, expecting him to pay the cash, we name the cash price to him; he takes it and walks out without saying anything about paying for it. So, of course, it must be charged. The same day or a few days later another credit customer comes in and asks for the same article and we ask him the regular credit price charged him. As our trading is nearly entirely with farmers who come to town on a rainy day, and will spend nearly all the day in town talking about tariff, crops, &c., it often happens that farmer No. 1 will meet farmer No. 2 on the street: "Buy a Fork?" "Yes." "How much?" "50 cents." "50 cents! Why I only paid 45 cents for mine." That settles No. 2 and he is going to have revenge, either by raising a racket or by stopping buying from a man who charges him more than he does his neighbor. I trust your correspondent will give us a little more light on this subject, as it is a very interesting one, and oblige A COUNTRY DEALER.

Referring to the combination between the foreign manufacturers of Screws, which we announced in our last issue, the London Ironmonger, July 7, remarks editorially:

The condition of the Screw trade for a long time past had been exceedingly unsatisfactory to the firms engaged in it, and the keenness of competition had led to such constant cutting of prices that profits were in many instances re-

duced to such fine proportions that the business was not worth having. In the end, this state of things has led to the arrangement under which the various leading markets are carefully apportioned, and prices are regulated so as to yield the makers what they consider a proper return for their capital and skill. The British home trade, naturally enough, is left exclusively to Nettlefold's, while the German home market is to be supplied exclusively by German makers. The French market naturally falls chiefly to the share of Japy Frères. As to Belgium, Switzerland, Scandinavia, Russia, Austria and the East of Europe, Italy, Turkey, Spain and Portugal, we are without definite information at the moment, but it is understood that the whole of these markets have been "arranged" in a manner which will be satisfactory to all parties concerned. All other markets—that is to say, all countries outside Europe—are, it is stated, to be supplied at a present discount of 72½ per cent. off Nettlefold's list, and it is understood that this part of the business is to be done on the principle known in America as "pooling." What the immediate effect of the arrangement upon prices will be we cannot state until the new lists or revised discounts are made known, but it is stated that net prices will be advanced by nearly 60 per cent. Of this, however, we have not definite information, and merely repeat what is stated by those who assert that they have knowledge to that effect. If that is the case, then it cannot be said that the new "arrangement" errs on the side of modesty, but exacts a very considerable penalty from consumers for the benefits they have derived from the competition of recent years. Whether the combination, as a whole, is wise from a British point of view we are scarcely in a position to state from the rather scanty details in our possession. On the face of it, however, it appears as though Nettlefold's had surrendered the foreign markets, or some of them, rather lightly, yet we are bound to assume that the managers of that concern have paid due regard to the "British interests" involved, and have not made concessions to their foreign competitors (friends now, we suppose) without obtaining equivalent advantages in other directions.

The James L. Haven Company, Cincinnati, Ohio, issue a sheet containing the following net prices to dealers on Sorghum Mills, Evaporators, Corn Crushers, Shellers, &c. The implements and machinery referred to in this price list are described and illustrated in other pamphlets:

The Economist Cane Mill.

No. 0, Steel shafts, 2 rolls. Capacity, 50 gallons per hour; weight 365 lbs. Price, \$17.50

The Pioneer Cane Mills.

Wrought steel shafts, turned bearings, gearing cast separate from the rolls and bored, rolls turned, brass boxes, feed boxes and patent step preventing clogging.

No. 00. Capacity, 50 gallons per hour.

Weight, 360 lbs. Price, \$20.00

No. 1. Capacity, 70 gallons per hour. Weight,

550 lbs. Price, \$27.50

No. 2. Capacity, 105 gallons per hour.

Weight, 750 lbs. Price, \$36.00

No. 3. Capacity, 134 gallons per hour.

Weight, 1000 lbs. Price, \$45.00

New South Cane Mills.

Steel shafts, flanged rolls, separate gear, brass boxes.

No. A. Light one-horse. Estimated capacity, 40 to 60 gal. per hour. Weight, 450

lbs. Price, \$20.00

No. B. Regular one-horse. Estimated capacity, 60 to 75 gal. per hour. Weight, 600

lbs. Price, \$27.50

No. C. Heavy one-horse. Estimated capacity, 75 to 90 gal. per hour. Weight, 725

lbs. Price, \$35.00

No. D. Regular two-horse. Estimated capacity, 90 to 100 gal. per hour. Weight, 1100 lbs.

Price, \$45.00

Champion Horizontal Cane Mills.

Letter A. One-horse. Approximate weight,

800 lbs. Capacity per hour, 60 gals. Price, \$27.50

Letter B. One or two horse. Approximate

weight, 700 lbs. Capacity per hour, 75

gals. Price, \$35.00

Letter C. Two-horse. Approximate weight,

900 lbs. Capacity per hour, 100 gals. Price, \$42.50

Cook's Patent Combined Portable Evaporators.

Including Pan, two Skimmers, Rocker Furnace,

Grate and Chimney.

Size of pan. Syrup per day. Acres cane per season.

No. 2. 44 x 72 in. 30 to 40 gals. 6 to 8

No. 3. 44 x 90 in. 40 to 60 gals. 8 to 12

No. 4. 44 x 108 in. 50 to 80 gals. 12 to 48

No. 5. 44 x 126 in. 70 to 100 gals. 20 to 30

With galv. Approx. weight, copper pan. weight.

No. 2. \$17.50 250 lbs. \$12.50 275 lbs.

No. 3. 21.00 275 lbs. 50.00 300 lbs.

No. 4. 24.50 300 lbs. 60.00 350 lbs.

No. 5. 29.75 350 lbs. 75.00 400 lbs.

With these Evaporators the following sizes of Mills can be used, but we recommend a Pan one size larger:

With No. 2, No. 0 Economist, A Western.

With No. 4, No. 1 Pioneer, B Western.

With No. 3, No. 0 Pioneer, A Champion.

With No. 5, B Champion, C Western.

Get an Evaporator large enough.

Cook's Patent Pans for Brick Furnace.

Galvanized iron or copper, with two skimmers complete.

Size of pan. Syrup per day. For acres.

No. 2. 44 x 72 in. 30 to 40 gals. 6 to 8

No. 3. 44 x 90 in. 40 to 60 gals. 8 to 12

No. 4. 44 x 108 in. 50 to 80 gals. 12 to 18

No. 5. 44 x 126 in. 75 to 120 gals. 15 to 30

No. 6. 44 x 144 in. 100 to 140 gals. 20 to 35

No. 7. 44 x 180 in. 125 to 175 gals. 30 to 45

Approx. Galv. Heavy

No. 2. weight. iron. copper.

No. 3. 100 lbs. \$8.75 \$30.00

No. 4. 125 lbs. 10.50 37.50

No. 5. 150 lbs. 12.25 42.50

No. 6. 165 lbs. 15.75 55.00

No. 7. 180 lbs. 19.25 65.00

No. 8. 230 lbs. 22.75 75.00

With these Pans the following sizes of Mills can be used, but we advise a Pan one size larger.

It is poor economy to use too small a Pan.

With No. 2, No. 0 Economist, A Western.

With No. 3, No. 0 Pioneer, A Champion.

With No. 4, No. 1 Pioneer, B Western.

With No. 5, B Champion, C Western.

With No. 6, No. 2 Pioneer, C Champion, D

Western.

With No. 7, No. 3 Pioneer.

Cook's Patent Furnace, with Grate and Chimney.

(No Pan.)

No. 2. For Pan, 44 x 72 in. Weight. Price.

No. 3. For Pan, 44 x 90 in. 200 lbs. \$10.00

No. 4. For Pan, 44 x 108 in. 215 lbs. 12.00

No. 5. For Pan, 44 x 126 in. 225 lbs. 14.00

No. 6. For Pan, 44 x 144 in. 250 lbs. 16.00

Furnace Doors and Grate Bars.

To be used with Evaporator Pans for Brick

Furnaces.

No. 1 Furnace Door, 16 x 18 in. \$3.00

No. 4 Grate, 18 x 33 in. 1.50

Haven's IXL Cider Mills.

With Double Cranks.

Senior, with double cranks and adjustable

feed rollers. Price, \$18.00

Medium, with one crank and adjustable feed

rollers. Price, 15.00

Junior, with one crank and adjustable feed

rollers. Price, 11.50

Haven's IXL Power Cider Mills.

No. 1. Rollers 10½ in. long by 8 in. diam.

Capacity, 100 to 200 bushels per hour

Price, \$60.00

No. 2. Rollers 14 in. long by 12 in. diam.

Capacity, 200 to 400 bushels per hour

Price, 100.00

Cider-Press Screws—Cast.

For Hand or Power Mills.

5 ft. long, 4 in. diam. Price, each, \$11.00

Little Giant Corn Crushers.

Complete, with Box, Hopper and Sweep.

No. 1. 2-cone, 1-horse, 5 to 8 bushels per

hour. Price, \$18.90

No. 2. 2-cone, light 2-horse, 7 to 10 bushels

per hour. Price, 22.00

No. 3. 3-cone, 2-horse, 8 to 12 bushels per

hour. Price, 29.70

No. 4. 3-cone, 3-horse, 12 to 20 bushels per

hour. Price, 37.80

This is the old and favorite pattern of Little

Giant, of which more have probably been sold

than of all other styles combined.

Excelsior Feed Mill.

Force Feed and White Iron Grinders. Complete

with Box, Hopper and Sweep.

No. 4. Estimated capacity, 5 to 15 bushels of

meal per hour, according to fineness

ground. Weight, 425 lbs. Price, \$24.80

Warranted to be well made of good material,

and to work well when properly managed.

Haven's IXL Corn Shellers.

Single, with Separator. Price, \$5.50

Single, with Separator and Fan. Price, 6.00

Extra for Hopper or Feed Table. Price, .40

Double, with Separator, Fan, Feed Table,

Crank and Pulley for power. Price, \$13.00

Eagle Corn Shellers.

Single, with Separator. Price, \$6.00

Single, with Separator and Fan. Price, 6.75

Extra for Hopper or Feed Table. Price, .50

Double, with Separator, Fan, Feed Table,

Crank and Pulley for power. Price, \$14.00

Horse Powers.

Light, with two Levers and Tumbling Shaft

and Pulley. Price, \$28.00

Heavy, with two Levers and Tumbling

Shaft and Pulley. Price, \$45.00

Heavy, with four Levers and Tumbling

Shaft and Pulley. Price, \$48.00

Road Scrapers.

No. 2, 28 in. wide; weight, 90 lb. Price, \$3.50

No. 3, 29 in. wide; weight, 100 lb. Price, 4.00

Sanford's Patent IXL Perfect Cutting Boxes.
For Hay and Straw.

No. 1, with 40 knives. Weight, 150 lbs. Price, each.....	\$6.75
No. 2, with 40 knives. Weight, 100 lbs. Price, each.....	5.00
No. 3, with 30 knives. Weight, 60 lbs. Price, each.....	4.00

Haven's IXL Lever Cutting Boxes.	
No. 0, 10-inch curved knife. Weight, 45 lbs. Price, each.....	\$3.60
No. 4, 11-inch curved knife. Weight, 55 lbs. Price, each.....	4.50
No. 3, 11-inch straight knife. Weight, 55 lbs. Price, each.....	3.60

The Eagle Hand Cutters.	
No. 0. One 8-in. knife, self-feed, geared 4 to 1, cuts $\frac{1}{4}$ or $\frac{3}{8}$ in. hay or straw, weight, 100 lbs. Price, each.....	\$8.70
No. 8. For hay, straw or fodder, 8-in. knife, cuts $\frac{3}{8}$ to $1\frac{1}{4}$ in., stop-feed, weight, 150 lbs. Price, each.....	11.40
No. 11. For hay, straw or fodder, 11-in. knife, cuts $\frac{3}{8}$ to $1\frac{1}{4}$ in., stop-feed, weight, 150 lbs. Price, each.....	13.20

Eagle Power Cutters—Three Sizes.	
No. 13. Two 13-in. knives, cuts $\frac{3}{8}$ to $3\frac{3}{4}$ in., stop-feed, safety fly-wheel, will cut two to three tons green fodder per hour. Price, each.....	\$24.00
No. 15. Two 15-in. knives, cuts $\frac{3}{8}$ to $3\frac{3}{4}$ in., stop-feed, safety fly-wheel, will cut three to four tons green fodder per hour. Price, each.....	27.00
No. 20. Four-feed or ensilage, two 20-in. knives, cuts $\frac{3}{8}$ to $3\frac{3}{4}$ in., stop-feed, safety fly-wheel, capacity, eight to ten tons per hour. Price, each.....	45.00

Lawn Vases.	
Painted White, or Green and Bronze.	
Berlin Vase and Base, No. 7.	
Height of Vase and base, 33 in. Price, each.....	\$9.00
Height of Vase alone, 21 in. Price, each.....	5.65
Grosvenor Vase and Base.	
No. 1. Height of Vase and base, 42 in. Price, each.....	12.15
No. 1. Height of Vase alone, 28 in. Price, each.....	9.00
No. 3. Height of Vase and base, 36 in. Price, each.....	9.00
No. 3. Height of Vase alone, 24 in. Price, each.....	5.85
No. 5. Height of Vase and base, 31 in. Price, each.....	5.85
No. 5. Height of Vase alone, 22 in. Price, each.....	4.05

Avon Vase and Base, No. 4.	
Height of Vase and base, 29 in. Price, each.....	\$5.85
Height of Vase alone, 17 in. Price, each.....	4.05
Woodberry Vase and Base, No. 2.	
Height of Vase and base, 40 in. Price, each.....	\$11.70
Height of Vase alone, 20 in. Price, each.....	8.55

Fernleaf Vase and Base, No. 1.	
Height of Vase and base, 32 in. Price, each.....	\$8.10
Height of Vase alone, 24 in. Price, each.....	6.30
Fernleaf Vase and Base, No. 2.	
Height of Vase and base, 32 in. Price, each.....	\$7.65
Height of Vase alone, 24 in. Price, each.....	5.85

Painted White or Green and Bronze to order.	
Fernleaf Vase and Base, No. 3.	
Height of Vase and base, 33 in. Price, each.....	\$7.20
Height of Vase alone, 25 in. Price, each.....	5.40
Fernleaf Vase and Base, No. 4.	
Height of Vase and base, 22 in. Price, each.....	\$5.85
Height of Vase alone, 14 in. Price, each.....	4.05

Lawn Settees.	
Rustic Settee.	
No. 1, will seat two persons. Price, each.....	\$6.75
No. 2, will seat three persons. Price, each.....	8.10
Grape Settee.	
No. 3, will seat two persons. Price, each.....	\$8.10
No. 4, will seat three persons. Price, each.....	9.45

Wood Slat Settees.	
No. 1, Wood Slats, Iron Legs, 4 ft. 8 in. long. Price, each.....	\$4.50
No. 2, Wood Slats, Iron Legs, 5 ft. long. Price, each.....	4.95

Lawn Chairs.	
Lattice Chair.	
No. 1, painted White, or any color to order. Price, each.....	\$3.80
Morning Glory Chair.	
No. 2, painted White, or any color to order. Price, each.....	\$4.95

Export Trade.

In the existing condition of domestic business, in which in many lines there is a capacity of production beyond the requirements of the trade, manufacturers are giving increased attention to export trade, and it is gratifying to observe that American Hardware is going in enlarged quantities and in greater variety of goods to foreign markets. As indicating something of the extent of our export business and the class of goods that are going abroad, we give the following detailed statement of shipments in the Hardware and related lines that have recently been made:

PER BARK ABIEL ABBOTT, FOR BRISBANE, QUEENSLAND.

By *Arkell & Douglas, New York*.—700 dozen Handles, 100 dozen Shovels, 50 dozen Picks, 40 dozen Axes, 350 dozen Handles, 22 Lawn Mowers, 20 dozen

Shovels, 10 dozen Spades, 12 dozen Rakes, 50 dozen Handles, 1 gross of Egg Beaters, 1 dozen Saws, 12 dozen Lanterns, 24 dozen Choppers, 20 dozen Shovels, 14 gross Axle Grease, 10 dozen Pulleys, 335 pounds of Nails, 1 case of Hardware, 2 dozen Hay Knives, 10 dozen Saws, 224 pounds Oil Stone, 2 dozen Braces, 1 dozen Sieves, 3 Bracket Saws, 5 packages of Hardware, 3 dozen Traps, 50 dozen Handles, 1 dozen Scales, 36 dozen Butts, 7 dozen Planes, 54 dozen Choppers, 6 dozen Saws, 7 packages of Hardware, 134 dozen Axes, 1 dozen Grindstones, 3 dozen Hand Screws, 1750 pounds of Axles, 6236 pounds of Castings.

By *V. Busanta, New York*.—50 dozen Shovels, 21 Churns, 6 dozen Manure Forks, 74 gross Fruit Jars, 34 dozen Plated Ware, 12 dozen Hay Forks, 4 dozen Wrenches, 12 dozen Liquid Glue, 54 gross of Locks, 1 gross of Gate Hinges, 6 dozen Twine Boxes, 2 dozen Money Drawers, 6 dozen Plumbs and Levels, 225 dozen Saws.

By *Reed & Barton*.—3 packages of Plated Ware.

By *H. W. Peabody & Co.*—600 dozen Handles, 39 dozen Blocks, 87 dozen Hay Forks, 1 case of Hardware, 3 Mowers.

BARK TILLIE BAKER TO MELBOURNE.

By *R. W. Cameron & Co.*—40 dozen Tools, 2 cases Sandpaper, 13 cases Castings, 1145 pounds of Bolts, 2 cases Carpet Sweepers, 1 case Hardware, 6 cases Forks, 3 cases Axles, 30 kegs of Nails, 6 boxes Hinges, 3 boxes Hammers, 1 box Castings, 9 cases Hubs, 10 cases Axles, 25 cases Roofing Slates, 1 case Fire Arms, 10 cases Axes.

By *McLean Bros. & Rigg*.—12 dozen Blacking Brushes, 5 dozen Apple Parers, 3 cases Electrical Apparatus, 3 gross Can Openers, 4 dozen Twin Screws, 36 Scales, 18 Jacks, 1 dozen Hog Rings, 2 dozen Grindstones, 4 dozen Hammers, 1 case Door Springs, 1 dozen Drills, 1 case Primers, 6700 pounds of Nails, 1036 pounds of Nails, 1900 pounds of Rivets, 110 dozen Axes, 84 gross Axle Grease.

By *Simpson, Hall, Miller & Co.*—950 pounds Plated Ware.

By *W. K. Freeman*.—3 cases Plated Ware.

By *Morris, Strouse & Co.*—3 packages Roller Skates.

By *R. W. Forbes & Son*.—72 dozen Gate Hinges, 8 cases Hardware, 1181 pounds of Wire Netting, 20 packages Hardware, 500 pounds Stone, 865 pounds Carriage Bolts, 110 sets of Axles, 2 packages Hardware, 17 packages Carriage Woodwork, 22 packages Hardware, 12 dozen Oilers, 6 dozen hammers, 14 packages Hardware, 3 packages of Pumps, 18 dozen Hatchets, 75 kegs Nails, 153 packages Carriage Woodwork.

By *Healy & Earl*.—1 box Dies and Rings, 16 cases Grain Mills, 4 cases Grain Mills, 1 box Wrenches, 2 cases Sandpaper, 1 case Emery-Wheels.

By *Arkell & Douglas*.—9 dozen Saws, 113 pairs Roller Skates, 5380 pounds of Bolts, 4 cases Hooks, 13 dozen Saws, 14 dozen Choppers, 9 dozen Forks, 9 dozen Axes, 36 dozen Handles, 6 dozen Hammers, 14 dozen Churns, 2 gross Wall Hooks, 3 dozen Sifters, 15 dozen Axes, 3 dozen Axes, 3935 pounds of Bolts, 16 dozen Saws, 14 dozen Wrenches, 24 dozen Hatchets, 1 dozen Guns, 67 pounds Tacks, 1 case Wall Hooks, 6 dozen Gate Hinges, 1 dozen Banks, 3 dozen Toys, 140 dozen Handles, 10 dozen Axes.

By *Meriden Britannia Company*.—7 packages Plated Ware, 2 boxes Plated Ware, 17 packages Plated Ware, 25 packages Plated Ware, 2 boxes Plated Ware, 5 boxes Plated Ware.

By *Russell & Erwin Mfg. Company*.—28 cases Hardware.

By *Hammacher & Delius*.—42 packages Hardware.

By *C. Walker*.—1 box Harrows.

By *W. H. Crossman & Bro.*—684 dozen Handles.

By *Martland, Phelps & Co.*—19 gross Swivel Snaps.

By *H. W. Peabody & Co.*—27 cases Mowers, 1983 pounds of Axle Grease, 6198 pounds Barb Wire, 30,682 pounds Barb Wire, 1 Refrigerator.

By *Coombs, Crosby & Eddy*.—15 dozen Hay Forks, 24 dozen Axes, 1 dozen Scales, 200 dozen Carpenters' Tools, 12 cases Axle Grease, 30 Wrenches, 80 dozen Carpenters' Tools.

By *Peck, Stow & Wilcox Company*.—13 boxes Tinsmiths' Tools.

By *Page, Dennis & Co.*—3 Refrigerators, 1 box Hardware, 1 package Trucks.

By *Reed & Barton*.—7 packages Plated Ware.

By *Rogers, Smith & Co.*—7 packages Plated Ware.

Arrangement of Stores.

McGibbon & Tarbox, Hancock, N. Y., furnish us material for description of Cross-cut Saw Case, which is shown in Fig. 254, which is referred to by them as exceedingly convenient and economizing space very satisfactorily. Saws are inserted top first

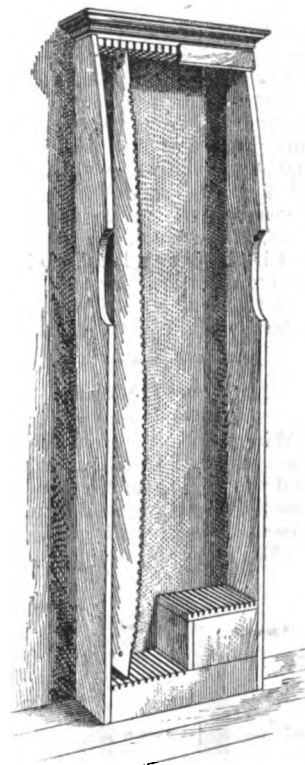


Fig. 254.—Cross-Cut Saw Case.

into slots back of the top board, part of which is shown broken away to indicate the construction. They are thus kept from falling forward, and are easily and quickly removed as desired. The Case, as shown, accommodates 12 each 6-foot and 54-foot Cross-cuts, and it is obvious that the same principle can be further applied for the accommodation of other sizes. The side pieces are made of wood $\frac{3}{4}$ inch thick and 7 inches wide. Their width at the top is 4 inches. The Rack stands against the wall.

The Paddock-Hawley Iron Company, of St. Louis, write us that they are informed that John Zamarana, a young Mexican formerly in their employ, has been using their name as reference without any authority from them.

Gillingham's Self-Sealing Cans.

The illustration given below represents these cans, which are made by the Postal Package Company, 34 South Paca street, Baltimore, Md. They are made in leading sizes from 2 x 2 to 4 x 7 inches. As indicated in the cut, the cans and tops are



Gillingham's Self-Sealing Cans.

threaded so as to give a simple and effective cover, which can be easily and quickly opened or closed. In the top of each cover there is an oil-proof washer that rests on the flange of the can, rendering the can, it is claimed, perfectly tight. The special advantage claimed for these cans is that they require no cement, solder or tools, and that as they are not destroyed in opening they will last for years. The company advise us that in addition to the demand for this article by families and other consumers dealers in paints are buying paints, &c., in bulk and putting them in cans with their own label, giving them an extra profit, which they could not make before, as they had no facilities for soldering on the top of the old style cans.

Improved Staples.

The Wire Goods Company, Worcester, Mass., are putting on the market a line of improved Wrought Staples, which, they advise us, is now complete. One of them is represented in the illustration given below. The special feature of these



Improved Wrought Staples.

goods, which are patented, is that the arms of the staples are the same size all the way down, so that they hold, it is claimed, with the well-known tenacity of a wire nail. It is pointed out by the company that hand-forged staples, or rolled or sheared staples, taper from the point to the limit of the part that goes into the wood, so that the staple rests in a tapering

socket. Hence, it is claimed, it is necessary to clinch the ordinary staple. With this staple the point is made that no clinching is required, the staples holding with sufficient tenacity without it. For this reason it is intimated that a much smaller size of staple will answer the purpose of a larger staple of the ordinary kind. It is further stated that staples made by this process are very uniform in size, and of unusually neat appearance. The company are now ready to supply all sizes, and put them on the market as wrought staples only, and also packed in the various forms of hook and staple, ring and staple, &c.

Weather-Proof Window.

G. W. Everett, No. 11 East Tenth street, New York, is directing attention to a weather-proof window which he is in-

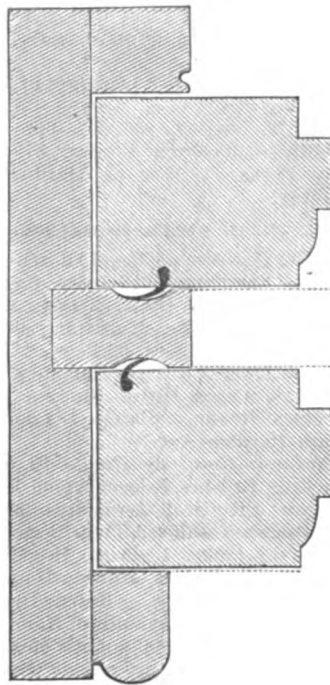


Fig. 1.—Horizontal Section Through Window Frame, Showing Application of Everett's Weather Proofing.

roducing. Fig. 1 of the engravings represents a horizontal section through the window frame, showing the inside and outside stops, parting strip and the sash. It will be noticed the special feature of improvement is a section of rubber introduced into the sash, for the reception of which a segmental groove is cut in the parting strip. The effect of this construc-

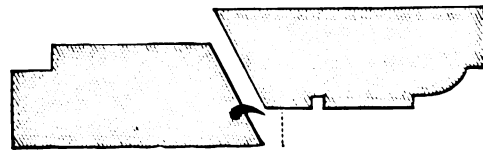


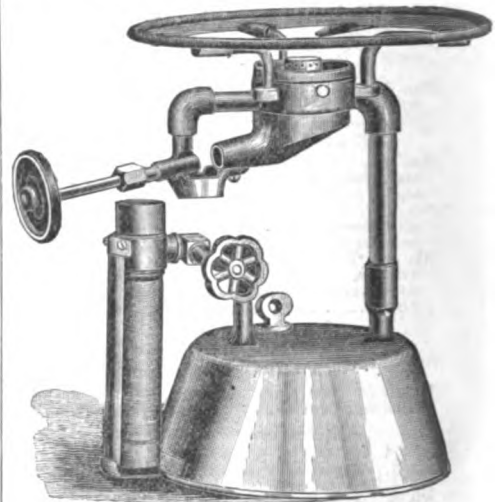
Fig. 2.—Vertical Section Through Meeting Rail with Everett's Improvement.

tion is to cause the rubber, by its elasticity, to spring outwardly against the parting strip, making the construction wind-tight. Fig. 2 of the engravings is supposed to represent a vertical section through the meeting rail of the window. The same feature, it will be noticed, is applied to the upper sash, with the exception that there is not the corresponding groove for receiving the rubber. The wedging of the rubber strip between the two parts of the meeting rail makes a wind-tight joint

at this place. The inventor asserts that the device can be applied to old or new work, and he is at present arranging for agencies to handle the material which he supplies and to put it in place with special tools, which he also provides.

The Picnic Lamp-Stove.

M. L. Hull, of Cleveland, Ohio, is offering the trade a neat gasoline lamp-stove, which he designates as the *Picnic*,



The Picnic Lamp Stove.

an illustration of which is shown in the accompanying engraving. This stove is designed to occupy a place not filled by anything at present on the market, and is adapted for light housekeeping, picnics, camping parties, &c. It is simple of construction, well made in all its parts and weighs only 3½ pounds. The grate to hold cooking vessels is made of sheet steel: the burner has but one valve, and the tank has a capacity for sufficient gasoline to keep the stove in operation for 5 or 6 hours. The manufacturer states that the wooden handle to the needle valve is of recent invention, and permits shortening the valve rod without burning the hand. The construction of the stove is such that a drum may be placed above the burner, transforming it into a convenient heating stove. The pressure is easily regulated by an ingenious device in the filler screw. The stove is also adapted for use as a sad-iron heater. The claim is made that it can be placed upon the ironing-board or table where it is convenient to the operator and thus does away with the necessity of keeping a hot coal fire during the summer months. The stove

is light yet strong, and capable of sustaining any cooking vessel it may be desired to use.

The Bank of America has just filed plans in the Building Department for the erection of a superb eight-story building at Nos. 44 and 46 Wall street, to cost \$400,000. The building will have a frontage of 69 feet and be 80 feet deep. The front will be of granite and limestone.

Solid Link Chain.

A novelty in chains adapted for various uses is being introduced by the Solid Link Chain Mfg. Company, No. 51 John street, New York. One form of the chain is



Fig. 1.—Solid Link Chain for Window Sash, &c.

shown in Fig. 1, and is approximately full size. It is that form which is adapted to be used for sash weights, with sash of medium to large size. Fig. 2 of the engravings shows how it is to be applied. The chain is also adapted for many other uses, among which may be mentioned belting and chains for ornamental purposes. When used for sash weights, it has the advantage of being very nearly of the same section as the ordinary cord used for the purpose. In other words, it is very nearly round, and is not liable to be damaged by twisting. As indicated by the name, it is composed of solid links, and is the product of some very ingenious machinery. The chains of this general class have been commonly constructed so that the cross portion in each link between the bends which connect it with the loops of the link, is curved in a direction opposite to the direction in which the loops are presented. The consequence is that when strain is applied to the chain the loops of each link have a tendency to draw and come together at the middle of the cross portion of the link which they embrace, thus impairing the flexibility of the chain. It is claimed that the chain here shown overcomes this difficulty entirely. The links, in order to

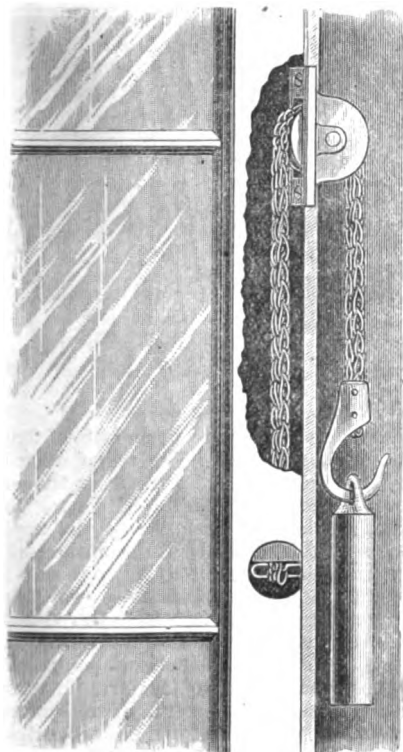


Fig. 2.—Sash and Weight Connected With Solid Link Chain.

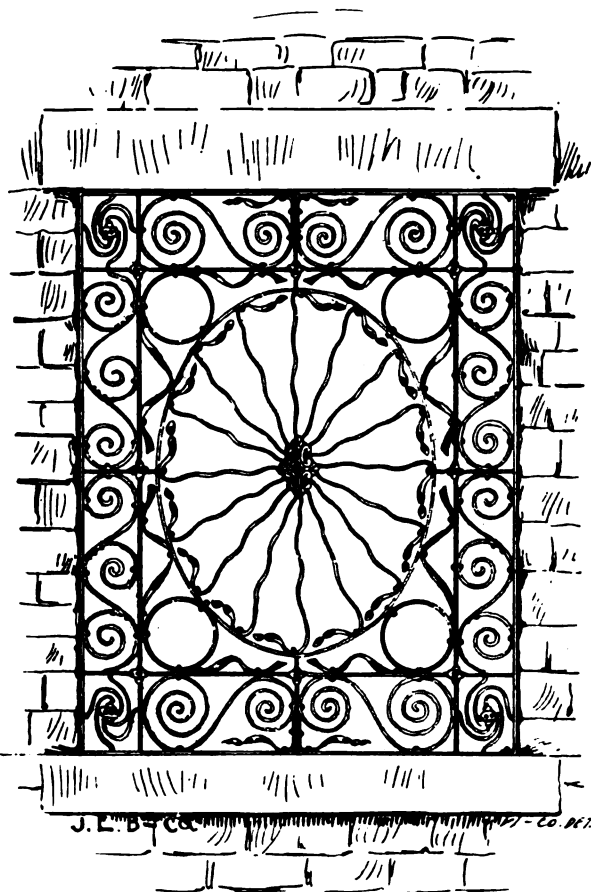
simulate the appearance of wire, are stamped from flattened wire, thus securing round edges. The chain is manufactured in several different forms, as well as in the cable shape here illustrated.

The Kentucky Wagon Mfg. Company, W. C. Nones, manager, manufacturers of the Old Hickory wagons, will soon move

into their new works, which are erected at South Louisville, a suburb of Louisville, Ky., and are built on a very large scale. They have bought the good-will, trademark and works of the Tennessee Wagon Works, operated by Cheny, Morrow & Co.,

inside the penitentiary of Nashville, Tenn. The latter parties will retire from the business at the expiration of their lease of the convicts, January 1st, 1890, and both members of the firm will be stockholders in the mammoth new factory at Louisville. The two brands of wagons made will be

well for light pressures. The difficulty with the use of this type of pipe or turbine was that when the pipe became old and weakened by decay it was liable to accidents, especially those caused, whenever the gates were closed quickly, by the impact of the energy of the water flowing through the wheel. The present water supply of Tokio, Japan, is by the wooden water-pipe system, which has been in existence over 200 years, furnishing at present a daily supply of from 25,000,000 to 30,000,000 gallons. There are several types of water-pipes in use, the principal class being built up with plank, square, and secured together by frames surrounding them at close intervals. The pipes, less than 6 inches, consist of bored logs, and somewhat larger ones are made by placing a cap on the top of a log in which a very large groove has been cut. All the connections are made by chamfered joints,



Window Guard, Manufactured by J. E. Bolles & Co., Detroit, Mich.

the Old Hickory and Tennessee, and the new works are being built with capacity to increase the output of both, which aggregated last year over 30,000 farm wagons. The Kentucky Wagon Mfg Company will be operated by free labor entirely, giving Louisville's skilled workmen a larger field.

Wood Water-Pipes.—All of the earlier water-works in America used mains of wood constructed out of what is known as pump logs, or timber bored from end to end by means of a pump auger, and pointed at one end so as to fit into the countersink at the end of the next log, the space between the two being caulked with oakum. It is known that these pump logs have certainly lasted nearly a century in some locations, although they are of course not to be compared with cast-iron pipes used for such purposes. In some portions of the western part of the United States they are using large water mains built of staves, made up similarly to a wooden trunk sometimes used to furnish a supply of water to turbines, and it is found that they answer their purpose very

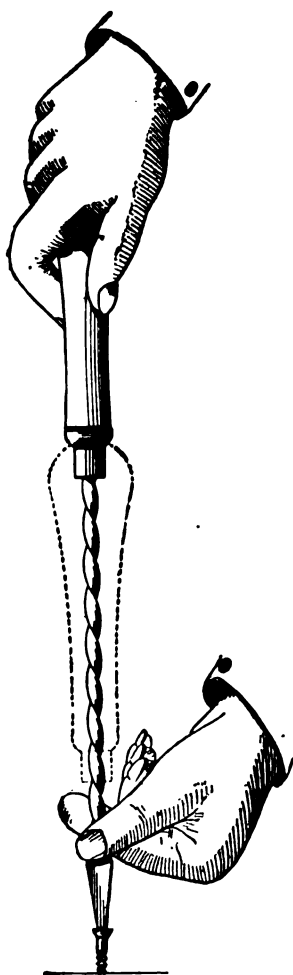
and cracks are caulked with an inner fibrous bark. Square boxes are used in various places to regulate the uniformity of the flow of the water, which is rather rapid, for the purpose of preventing aquatic growth. The water is not delivered to the houses, but into reservoirs on the sides of the streets, nearly 15,000 in number.

Iron Window Guard.

Every year shows more and more taste displayed in design as well as in features of construction of wrought-iron work. Not only do the architects vie with each other in producing appropriate designs in work of this class for use in various places, but manufacturers as well give special attention to forms in which their material may be worked to produce graceful effects, while at the same time accomplishing the special objects in view. The accompanying design represents a window guard recently brought out by J. E. Bolles & Co., of Detroit, Mich. The parts are clearly defined and the work speaks for itself.

Automatic Screw-Driver.

The Shaver Corporation, No. 157 Broadway, New York, are introducing what is known as Shaver's Automatic Screw-Driver, an illustration of which is presented in the annexed engraving. The screw-



Shaver's Automatic Screw-Driver.

driver is of the spiral variety, the shank being twisted and working through proper mechanism in the ferrule of the handle, as shown. It differs in various details of construction from other spiral screw-drivers which we have illustrated in the past, and is of a size and character to be very useful for both amateurs and mechanics. The handle itself, which in the sample before us is made of hard wood, measures 9 inches in length. When the screw-driver is extended the total length is 17 inches. The handle where the hand would grasp it is nearly 2 inches in diameter, dimensions which constitute it of more interest to mechanics than is usual with tools of this class. Another advantage is its lightness. The cut shows the method of holding the tool at the beginning of the stroke, the dotted line showing the position of the handle at the end of each stroke. The makers mention that the screw may be driven with this tool without any hole being prepared for the screw, the driver being so powerful that the screw, including the countersink, can be forced into soft wood without difficulty. The whole operation for driving an ordinary screw is accomplished by three straight thrusts of the hand, using, the makers assert, no more power at each thrust than is required by the ordinary method.

An agent of the Government of Mexico is visiting New York and Pittsburgh for the purpose of making contracts for a dozen light-houses for the Pacific Coast. A contract will probably be made for the

first two in America, and if terms are satisfactory as against the English, the balance will be made in this country also.

Combined Bench and Tool Chest.

In the accompanying engraving we present a general view of a work-bench and tool-cabinet, being a novelty that has been introduced to the English trade by R. Melhuish & Son, of London, England. As it has many features of interest, we have believed our readers would be pleased with a description of it. It will be noticed that, in addition to the space afforded by the drawers, which occupy the principal portion of the front, a receptacle for tools is provided at either end, inside of swinging doors. In turn the lid is utilized, as is clearly shown in the cut, and only when it is raised is the work-bench brought into view. A vise for holding a board for working on the edge is shown, and also pins for supporting the opposite end of the work has thus been prepared it is painted



Combination Tool Cabinet and Bench for Amateurs' Use.

board. According to the description which has reached us this article, as prepared for the English trade, is made of dark walnut, polished. The doors are finished with self-acting catches. The bench itself is composed of well-seasoned beech, and the drawers have polished brass handles and are divided and subdivided to hold screws, hooks and nails, and the large variety of articles that are required in connection with an outfit of this kind. The statement is made that the whole of the six drawers, two cupboards and top can be instantly closed and fastened with one small lock and key, thus leaving the cabinet in the shape of a very pleasing piece of furniture. There may be a suggestion in this cabinet which some of our readers will work out for their own use.

The Society of Civil Engineers lately in session in Milwaukee, Wis., propose to put up a fire-proof structure in New York for the preservation of the society's records. The estimated cost of the building is \$140,000, and the available fund \$30,000, leaving \$110,000 to be raised by subscription.

Pa Crusta.

Pa Crusta is the name which has been adopted for a new mural and ceiling decoration that has been brought to public notice by the McDonnell-Mallen decorative Company, of Jacksonville, Ill. It is a rival of *lincresta walton* and *papier maché* in its decorative effects, but is vastly different in its preparation and application, as well as its low cost. As far as it is possible to ascertain the new process consists in the application to a suitably prepared wall or ceiling of ordinary brown wrapping paper, moistened with a paste which causes it to adhere to the plaster, and at the same time enables it to be molded into various designs by the hand. No molds are employed for the production of set figures and patterns, but, on the contrary, an irregular appearance is intentionally sought by the originators of this method of decoration. After the ground work has thus been prepared it is painted

in bronze, silver, or any other style of finish that may be desired. The ticket office of the Michigan Central Railroad, at the corner of Clark and Randolph streets, Chicago, is the first instance of the application of this method of decoration on a proper scale accessible to the public. In order to show its capabilities several styles of treatment have been here introduced, but without by any means exhausting the range, as other combinations continually suggest themselves to the artistic workman. It seems in a high degree unconventional, bold and striking in its originality. Those interested in the process claim that the application of this method of decoration is very simple, so that talented and therefore high-priced workmen are not absolutely essential to its successful arrangement. It is also very easily repaired if it is accidentally chipped, which is quite a favorable recommendation. It is the intention of the company to confine their work to dwelling houses and offices, avoiding saloons. In this way they claim a larger patronage will be assured among those who desire to see their houses look differently from drinking resorts.

CURRENT HARDWARE PRICES.

JULY 18, 1888.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers' name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers at the figures named.

Ammunition.

Caps, Percussion, #1000—	
Rich & Goldmark's	
7 L. Waterproof, 1-10's.....	50¢
8 B. Trimm'd Edge, 1-10's.....	55¢
8 B. Ground Edge, Central Fire, 1-10's.....	70¢
Double Waterproof, 1-10's.....	1.40
Bucket Waterproof, 1-10's.....	55¢
8 B.....	30¢
Union Metallic Cartridge Co.	
F. O. Trimm'd.....	50¢
F. L. Ground.....	55¢
Can. Fire Group.....	70¢
Double Waterproof.....	1.40
Double Wat'proof, in 1-10's.....	1.40
8 B. Genuine Imported.....	45¢
Key's 8 B.....	54¢
Key's D Waterproof, Central Fire.....	1.60

Cartridges.

8 B. Fire Cartridges.....	dis 50¢
8 B. Fire Military.....	dis 55¢
Central Fire, Pistol and Rifle.....	dis 25¢
Central Fire, Military & Sporting.....	dis 15¢
Blank Cartridges, except 23 and 32 cal, an additional 10% over above discounts.....	
Blank Cartridges, 23 cal.....	1.75, dis 2
Blank Cartridges, 32 cal.....	1.50, dis 2
Primed Shells and Bullets.....	dis 15¢
8 B. Cape, Round Ball.....	1.75, dis 2
8 B. Cape, Conical Ball, Swaged.....	1.50, dis 2
Primers—	
Berdan Primers all sizes, and B. L. Caps (for	
Scout's).....	1.00, dis 2
All other Primers, all sizes.....	1.20, dis 2
Shells—	
First quality, 4, 8, 10 and 12 gauge, dis 25¢	
First quality, 14, 16 and 20 gauge (10 list).....	dis 10¢
Star, Club, Rival and 10-gauge, 90 list.....	dis 80¢
Climax Brands.....	dis 35¢
Club, Rival and Climax Brands, 14, 16 and 20 gauge.....	dis 30¢
Seibold's Combination Shot Shells.....	dis 15¢
Brass Shot Shells, 1st quality.....	dis 60¢
Brass Shot Shells, Club, Rival and Climax.....	dis 65¢

Shells Loaded.

List No. 19, 1887.....	dis 20 & 10
Wads—	
U. M. C. & W. R. A.—B. E., 11 up.....	2.00
U. M. C. & W. R. A.—B. E., 9 & 10.....	2.30
U. M. C. & W. R. A.—B. E., 7 & 8.....	2.00
U. M. C. & W. R. A.—P. E., 11 up.....	2.10
U. M. C. & W. R. A.—P. E., 9 & 10.....	4.00
U. M. C. & W. R. A.—P. E., 7 & 8.....	4.90
Key's P. E., 11 up.....	1.75
Key's P. E., 9 & 10.....	2.50
Avia's—Eagle Avia's.....	10¢, dis 20 & 30
Peter Wright.....	10¢
Armstrong's Mouse Hole.....	10¢
Armstrong Mouse Hole, Extra.....	11¢
Trouton.....	10¢
Whitson's.....	10¢
I. & Riley Carr. Patent Solid.....	11¢
Small extra often given.	

Small extra often given.

Avia's—Eagle Avia's.....	10¢, dis 20 & 30
Peter Wright.....	10¢
Armstrong's Mouse Hole.....	10¢
Armstrong Mouse Hole, Extra.....	11¢
Trouton.....	10¢
Whitson's.....	10¢
I. & Riley Carr. Patent Solid.....	11¢
Small extra often given.	

Angers and Bits.

Douglas Mfg. Co.....	
New Haven Copper Co.....	
Wm. A. Ives & Co.....	dis 70
Humphreysville Mfg. Co.....	
French, Swift & Co. (F. H. Beecher).....	dis 55
Cook's, Douglas Mfg. Co.....	dis 55
Cook's, New Haven Copper Co.....	dis 50 & 10
Ives' Circular Lip.....	dis 60
Patent Solid Head.....	dis 80
O. E. Jennings & Co., No. 10, extension lip.....	dis 40
O. E. Jennings & Co., No. 30.....	dis 60
O. E. Jennings & Co., Anger Bits in fancy boxes.....	dis 20
Low's Patent Solid Anger and Bits.....	dis 25
Low's Patent Solid Anger and Bits.....	dis 25
Low's Patent Solid Anger and Bits.....	dis 25
Low's Patent Solid Anger and Bits.....	dis 25

Bits.

French, Swift & Co.....	dis 25 & 10
Douglas.....	dis 25 & 10
Bonney's Adjustable.....	dis 40 & 10
Stearns.....	dis 20 & 10
Ives' Expansive, each \$4.50.....	dis 60 & 10
Universal Expansive, each \$4.50.....	dis 60 & 10
Wood's.....	dis 25 & 10
Expansive Bits—	
Clark's small, 18; large, 20.....	dis 35 & 40
Ives' No. 4, per doz., 300.....	dis 35 & 40
Stearns' No. 1, 200; No. 2, 300.....	dis 35 & 40
Stearns' No. 2, 300.....	dis 35 & 40
Small Bits—	
Common.....	dis 25 & 10
Diamond.....	dis 25 & 10
Double Out, Shepardson's.....	dis 45 & 50
Double Out, Ch. Valley Mfg. Co.....	dis 50 & 10
Double Out, Hartwell's.....	dis 50 & 10
Double Out, Douglas.....	dis 50 & 10
Double Out, Ives.....	dis 50 & 10

Bit Stock Drills.

Morse Twist Drills.....	dis 50 & 10
Standard.....	dis 50 & 10
Cleveland.....	dis 50 & 10
Syracuse, for metal.....	dis 50 & 10
Syracuse, for wood (wood list).....	dis 50 & 10
Williams' or Holt's, for metal.....	dis 50 & 10
Williams' or Holt's, for wood.....	dis 50 & 10
Small Augers and Bits—	
Homedmedien's.....	dis 15 & 10
Watrous's.....	dis 15 & 10
Small's.....	dis 15 & 10
Small's Ship Auger Pattern Car Bits.....	dis 15 & 10
Awl Handle.	
Sewing, Brass Ferrule.....	dis 45 & 10
Patent Sewing, Short.....	dis 40 & 10
Patent Sewing, Long.....	dis 40 & 10
Patent Peg, Plain Top.....	dis 45 & 10
Patent Peg, Leather Top.....	dis 45 & 10

Awls, Brad Sets, &c.

Awls, Sewing, Common.....	dis 35
Awls, Shouldered Peg.....	dis 40
Awls, Patent Peg.....	dis 40
Awls, Shouldered Brad.....	dis 35
Awls, Handled Brad.....	dis 45
Awls, Handled Scratch.....	dis 35
Awls, Socket Scratch.....	dis 30

Awl and Tool Sets.

Allen's Sets, Awls & Tools, No. 20, W. 10.....	dis 50 & 10
Pray's Ad Tool Hds., Nos. 1, 2, 3, 4, 5.....	dis 25 & 10
Miller's Falls Adj. Tool Hds., Nos. 1, 2, 3.....	dis 25 & 10
Henry's Cabinion Hds.....	dis 30
Brad Sets, No. 45, 10.50, No. 45, 12.50.....	dis 70 & 10
Brad Sets, Stanley's Excelsior, No. 1, 7.50.....	dis 80 & 10
Brad Sets, Stanley's Excelsior, No. 2, 8.00.....	dis 80 & 10
Brad Sets, Stanley's Excelsior, No. 3, 8.50.....	dis 80 & 10

Awls.

Makers' and Special Brands—	
First quality.....	dis 25, 30 & 35
Others.....	dis 25, 30 & 35
Awls Grosse.	
Fraser's, in bulk.....	dis 25, 30 & 35
Fraser's, in boxes.....	dis 25, 30 & 35
Dixon's Everlasting, in bxs., 1 doz., 1 doz., 2 doz., 3 doz.....	dis 25, 30 & 35
Dixon's Everlasting, 10-b pails, each, 85¢	
Lower grades, special brands.....	dis 25, 30 & 35

Awls—No. 1, 4¢ & 5¢; No. 2, 5¢ & 6¢.

No. 7 to 18.....	dis 50 & 55
No. 19 to 23.....	dis 60 & 10
National Wrought Steel Tubular Self-Oiling.....	dis 60 & 10
Standard Farm (1 to 5) and Special Farm (A1 to A5).....	dis 60 & 10
Less than 10 sets.....	dis 60 & 10
Over 10 sets.....	dis 60 & 10
XX Strong Exp. (6 to 9), & XX Strong Truck (10 to 15).....	dis 60 & 10
Less than 10 sets.....	dis 60 & 10
Over 10 sets.....	dis 60 & 10

Awls Holders.

Burgess's Pat. V doz 18.....	dis 60
Burgess's Spring Balances.....	dis 60
Common 24's.....	dis 60
Chattillon's Spring Balances.....	dis 60
Chattillon's Circular Spring Balances.....	dis 60

Bells.

Light Brass.....	dis 70 & 10
Extra Heavy.....	dis 70 & 10
White Metal.....	dis 70 & 10
Silver Chime.....	dis 70 & 10
Globe (Cone's Patent).....	dis 70 & 10
Door—	
Gong, Abbe's.....	dis 25 & 10
Gong, Yankee.....	dis 40 & 10
Gong, Barker's.....	dis 40 & 10
Gong, Taylor's.....	dis 25 & 10
Gong, Brooks.....	dis 50 & 10
Gong, Cone's.....	dis 10
Gong, Cone's.....	dis 10
Lever, Sargent's.....	dis 60 & 10
Lever, Taylor's.....	dis 60 & 10
Lever, Barker's.....	dis 60 & 10
Lever, Taylor's.....	dis 60 & 10
Lever, Barker's.....	dis 60 & 10
Full Brook's.....	dis 60 & 10
Full Western.....	dis 60 & 10

Common Wrought.

Common Wrought.....	dis 60 & 10
Western.....	dis 60 & 10
Western, Sargent's list.....	dis 60 & 10
Kentucky.....	dis 60 & 10
Kentucky, Sargent's list.....	dis 60 & 10
Dodge, Genuine Kentucky, new list.....	dis 60 & 10
Texas Star.....	dis 60 & 10
Call.....	dis 60 & 10
Farm Bells.....	dis 60 & 10
Steel Alloy Church and School Bells.....	dis 60 & 10
Bellows—Blacksmiths.....	dis 60 & 10
Molders.....	dis 60 & 10
Band Belows.....	dis 60 & 10

Belting, Rubber.

Common Standard.....	dis 70 & 10
Standard.....	dis 70
Extra.....	dis 60 & 10
N. Y. & P. Co., Standard.....	dis 60 & 10
N. Y. & P. Co., Extra Standard.....	dis 60 & 10
Belch Steps.....	dis 60 & 10
Horrell's.....	dis 60 & 10
Hotchkiss's.....	dis 60 & 10
Weston's, per doz No. 1, \$10; No. 2, \$8.....	dis 60 & 10
McGill's.....	dis 60 & 10

Bits—Auger, Gimlet Bit Stock, Drills, &c., see Augers and Bits.

Bit Holders.	
Extension, Barker's.....	dis 40 & 10
Extension, Ives.....	dis 40 & 10
Diagonal.....	dis 40 & 10
Angular.....	dis 40 & 10
Blind Adjusters.	
Domestic.....	dis 35 & 40
Excelsior.....	dis 40 & 10
Washburn's Self-Locking.....	dis 30 & 40
Blind Fasteners.	
MacKrell's.....	dis 30 & 40
Van Sand's Screw Pattern.....	dis 30 & 40
Van Sand's Old Pattern.....	dis 30 & 40
Washburn's Old Pattern.....	dis 30 & 40
Austin's Bdy No. 2000.....	dis 30 & 40
Security Gravity.....	dis 30 & 40
Blind Staples.	
Barbed, 1/2 in. and larger.....	dis 30 & 40
Barbed, 1/2 in.....	dis 30 & 40
Blocks.	
Ordinary Tackle, list April 17, '88.....	dis 40
Cleveland Block Co., Mal. Iron.....	dis 50
Novelty Tackle Blocks, Mal. Iron.....	dis 50

Door and Shutter.

Cast Iron Barrel, Square, &c.....	dis 70 & 10
Cast Iron Shutter Bolts.....	dis 70 & 10
Cast Iron Chain (Sargent's list).....	dis 55
Ives' Patent Door Bolts.....	dis 55
Wrought Barrel.....	dis 70 & 10
Wrought Square.....	dis 70 & 10
Wt's Shutter all Iron, Stanley's list.....	dis 60 & 10
Wt's Shutter, Brass Knob, Stanley's list.....	dis 60 & 10
Wrought Shutter, Sargent's list.....	dis 60 & 10
Wrought Shutter, Stanley's list.....	dis 60 & 10
Wrought Shutter, Stanley's list.....	dis 60 & 10
Wrought Shutter, Stanley's list.....	dis 60 & 10

Carriage.

Common list June 10, '88.....	dis 75 & 25
Genuine Eagle, list Oct. '84.....	dis 75 & 25
Phila. pattern, list Oct. 7, '84.....	dis 75 & 25
H. & W. old list.....	dis 70

Common list Feb. 23, 1888.

P. C. B. & N. Co., Empire, list Feb. 23, 1888.....	dis 70
P. C. B. & N. Co., Philadel., list Oct. '84.....	dis 85
P. C. B. & N. Co., Keystone, Phil. list Oct. '84.....	dis 80
P. C. B. & N. Co., Norway, Phil. list Oct. '84.....	dis 75
Am. S. Co., Norway, Phil. list Oct. '84.....	dis 75
Am. S. Co., East, Phil. list Oct. '84.....	dis 80
Am. S. Co., Philadel., list Oct. 15, '84.....	dis 85
Am. S. Co., Bay State, list Feb. 23, '85.....	dis 70
R. B. & W. Philadel., list Oct. 15, 1884.....	dis 82
R. & E. Mfg. Co., Philadel.....	dis 70

Stove and Plow.

Stove.....	dis 65
Plow.....	dis 65
Am. S. Co. Stove, Annealed.....	dis 65
R. B. & W. Plow.....	dis 65
R. B. & W. Stove.....	dis 65
R. & E. Mfg. Co., Stove.....	dis 65
Machine.....	dis 75 & 10
Bolt Ends.....	dis 75 & 10

Sewing Machines.

Without Augers. Upright. Angular.	
Douglas.....	dis 50
Snell's, Rice's Patent.....	dis 50
Jennings.....	dis 50
Other Machines.....	dis 50
Phillips' Pat., with Augers 7.90	dis 50

Sew Pins.

Humason, Beckley & Co.'s.....	dis 60 & 10
Sargent & Co.'s.....	dis 60 & 10
Peck, Stow & W. Co.....	dis 60 & 10

Braces.

Backus, Nos. 110 to 114 and 31 to 32.....	dis 60 & 10
Backus, Nos. 6, 8, 12, 14.....	dis 60 & 10
Backus, Nos. 16, 18, 20, 22, 24, 26, 28, 30.....	dis 60 & 10
Barber's, Nos. 10 to 15.....	dis 50
Barber's, Nos. 30 to 35.....	dis 50
Barber's, Nos. 40 to 45.....	dis 50
Barker's, Nos. 8, 10 and 12.....	dis 75 & 10
Barker's, Plated, Nos. 8, 10 and 12.....	dis 75 & 10
Osgood's Ratchet.....	dis 40 & 10
Spofford's.....	dis 40 & 10
Ives' New Haven Ratchet.....	dis 60 & 10
Ives' New Haven Ratchet.....	dis 60 & 10
Ives' Barber Ratchet.....	dis 60 & 10
Ives' Barbers.....	dis 60 & 10
Ives' Spofford.....	dis 60 & 10
Common Ball, American.....	dis 10
Bartholomew's, Nos. 25, 27, 30.....	dis 60 & 10
Bartholomew's, Nos. 117, 118, 119.....	dis 70 & 10
Amidon's Barker's Imp'd Plaine.....	dis 75 & 10
Amidon's Barker's Imp'd Nickle.....	dis 75 & 10
Amidon's Ratchet.....	dis 75 & 10
Amidon's Eclipse Ratchet.....	dis 60
Amidon's Globe Jawed.....	dis 40 & 10
Amidon's Corner Brace.....	dis 40 & 10
Amidon's Sprocket.....	dis 10
Amidon's Buffalo Ball.....	dis 10
P. S. & W.....	dis 60 & 10

Brackets.

Shelf, plain, Sargent's list.....	dis 55 & 10
Shelf, fancy, Sargent's list.....	dis 60 & 10
Reading, plain.....	dis 60 & 10
Reading, Rosette.....	dis 60 & 10
Bright Wire Goods.....	dis 80 & 30
Broilers.....	dis 10
Hens' Self-Basting.....	dis 50
Buckets—See Well Buckets and Pails.	
Full Minge—Union Co. Nut.....	dis 55
Sargent's.....	dis 60 & 10
Hotchkiss' low list.....	dis 30
Humason, Beckley & Co.'s.....	dis 70
Peck, Stow & W. Co.'s.....	dis 60 & 10
Elrich Hdw. Co., White Metal, low list.....	dis 10

Butcher's Cleavers.

\$16.50 19.00 21.50 24.00 27.00 30.00 33.50 36.50	
New Haven Edge Tool Co.'s.....	dis 40
P. S. & W.....	dis 33 & 45 33 & 40
Butts.....	
Brass-----	
Wrought Brass.....	dis 70 & 70 & 10
Cast Brass. Tiebout's.....	dis 33 & 4
Cast Brass. Corbin's Fast.....	dis 33 & 10
Cast Brass. Loose Joint.....	dis 33 & 10
Cast Iron-----	
Fast Joint. Narrow.....	dis 50 & 10
Fast Joint. Broad.....	dis 50 & 10
Loose Joint.....	
Loose Joint. Japanned.....	
Loose Joint. Jap. with Acorns.....	

Best Anti-Friction.....	dis 60
Duplex (Wood Track).....	dis 60
Terry's Patent.....	dis 60
Oriskany's Patent.....	dis 60
Wood Track Iron Clad.....	dis 60
Carrier Steel Anti-Friction.....	dis 60
Architect.....	dis 60
Edwards.....	dis 60
Richards.....	dis 60
Lane's Steel Anti-Friction.....	dis 60
The Ball Bearing Door Hanger.....	dis 60
Warner's Patent.....	dis 60
Stearns' Anti-Friction.....	dis 60
Stearns' Challenge.....	dis 60
Paragon, Nos. 1, 2 and 3.....	dis 60
Paragon, Nos. 4, 5, 6, 7 and 8.....	dis 60
Paragon, Nos. 9, 10, 11 and 12.....	dis 60
Paragon, Nos. 13, 14, 15 and 16.....	dis 60
Paragon, Nos. 17, 18, 19 and 20.....	dis 60
Paragon, Nos. 21, 22, 23 and 24.....	dis 60
Paragon, Nos. 25, 26, 27 and 28.....	dis 60
Paragon, Nos. 29, 30, 31 and 32.....	dis 60
Paragon, Nos. 33, 34, 35 and 36.....	dis 60
Paragon, Nos. 37, 38, 39 and 40.....	dis 60
Paragon, Nos. 41, 42, 43 and 44.....	dis 60
Paragon, Nos. 45, 46, 47 and 48.....	dis 60
Paragon, Nos. 49, 50, 51 and 52.....	dis 60
Paragon, Nos. 53, 54, 55 and 56.....	dis 60
Paragon, Nos. 57, 58, 59 and 60.....	dis 60
Paragon, Nos. 61, 62, 63 and 64.....	dis 60
Paragon, Nos. 65, 66, 67 and 68.....	dis 60
Paragon, Nos. 69, 70, 71 and 72.....	dis 60
Paragon, Nos. 73, 74, 75 and 76.....	dis 60
Paragon, Nos. 77, 78, 79 and 80.....	dis 60
Paragon, Nos. 81, 82, 83 and 84.....	dis 60
Paragon, Nos. 85, 86, 87 and 88.....	dis 60
Paragon, Nos. 89, 90, 91 and 92.....	dis 60
Paragon, Nos. 93, 94, 95 and 96.....	dis 60
Paragon, Nos. 97, 98, 99 and 100.....	dis 60
Paragon, Nos. 101, 102, 103 and 104.....	dis 60
Paragon, Nos. 105, 106, 107 and 108.....	dis 60
Paragon, Nos. 109, 110, 111 and 112.....	dis 60
Paragon, Nos. 113, 114, 115 and 116.....	dis 60
Paragon, Nos. 117, 118, 119 and 120.....	dis 60
Paragon, Nos. 121, 122, 123 and 124.....	dis 60
Paragon, Nos. 125, 126, 127 and 128.....	dis 60
Paragon, Nos. 129, 130, 131 and 132.....	dis 60
Paragon, Nos. 133, 134, 135 and 136.....	dis 60
Paragon, Nos. 137, 138, 139 and 140.....	dis 60
Paragon, Nos. 141, 142, 143 and 144.....	dis 60
Paragon, Nos. 145, 146, 147 and 148.....	dis 60
Paragon, Nos. 149, 150, 151 and 152.....	dis 60
Paragon, Nos. 153, 154, 155 and 156.....	dis 60
Paragon, Nos. 157, 158, 159 and 160.....	dis 60
Paragon, Nos. 161, 162, 163 and 164.....	dis 60
Paragon, Nos. 165, 166, 167 and 168.....	dis 60
Paragon, Nos. 169, 170, 171 and 172.....	dis 60
Paragon, Nos. 173, 174, 175 and 176.....	dis 60
Paragon, Nos. 177, 178, 179 and 180.....	dis 60
Paragon, Nos. 181, 182, 183 and 184.....	dis 60
Paragon, Nos. 185, 186, 187 and 188.....	dis 60
Paragon, Nos. 189, 190, 191 and 192.....	dis 60
Paragon, Nos. 193, 194, 195 and 196.....	dis 60
Paragon, Nos. 197, 198, 199 and 200.....	dis 60
Paragon, Nos. 201, 202, 203 and 204.....	dis 60
Paragon, Nos. 205, 206, 207 and 208.....	dis 60
Paragon, Nos. 209, 210, 211 and 212.....	dis 60
Paragon, Nos. 213, 214, 215 and 216.....	dis 60
Paragon, Nos. 217, 218, 219 and 220.....	dis 60
Paragon, Nos. 221, 222, 223 and 224.....	dis 60
Paragon, Nos. 225, 226, 227 and 228.....	dis 60
Paragon, Nos. 229, 230, 231 and 232.....	dis 60
Paragon, Nos. 233, 234, 235 and 236.....	dis 60
Paragon, Nos. 237, 238, 239 and 240.....	dis 60
Paragon, Nos. 241, 242, 243 and 244.....	dis 60
Paragon, Nos. 245, 246, 247 and 248.....	dis 60
Paragon, Nos. 249, 250, 251 and 252.....	dis 60
Paragon, Nos. 253, 254, 255 and 256.....	dis 60
Paragon, Nos. 257, 258, 259 and 260.....	dis 60
Paragon, Nos. 261, 262, 263 and 264.....	dis 60
Paragon, Nos. 265, 266, 267 and 268.....	dis 60
Paragon, Nos. 269, 270, 271 and 272.....	dis 60
Paragon, Nos. 273, 274, 275 and 276.....	dis 60
Paragon, Nos. 277, 278, 279 and 280.....	dis 60
Paragon, Nos. 281, 282, 283 and 284.....	dis 60
Paragon, Nos. 285, 286, 287 and 288.....	dis 60
Paragon, Nos. 289, 290, 291 and 292.....	dis 60
Paragon, Nos. 293, 294, 295 and 296.....	dis 60
Paragon, Nos. 297, 298, 299 and 300.....	dis 60
Paragon, Nos. 301, 302, 303 and 304.....	dis 60
Paragon, Nos. 305, 306, 307 and 308.....	dis 60
Paragon, Nos. 309, 310, 311 and 312.....	dis 60
Paragon, Nos. 313, 314, 315 and 316.....	dis 60
Paragon, Nos. 317, 318, 319 and 320.....	dis 60
Paragon, Nos. 321, 322, 323 and 324.....	dis 60
Paragon, Nos. 325, 326, 327 and 328.....	dis 60
Paragon, Nos. 329, 330, 331 and 332.....	dis 60
Paragon, Nos. 333, 334, 335 and 336.....	dis 60
Paragon, Nos. 337, 338, 339 and 340.....	dis 60
Paragon, Nos. 341, 342, 343 and 344.....	dis 60
Paragon, Nos. 345, 346, 347 and 348.....	dis 60
Paragon, Nos. 349, 350, 351 and 352.....	dis 60
Paragon, Nos. 353, 354, 355 and 356.....	dis 60
Paragon, Nos. 357, 358, 359 and 360.....	dis 60
Paragon, Nos. 361, 362, 363 and 364.....	dis 60
Paragon, Nos. 365, 366, 367 and 368.....	dis 60
Paragon, Nos. 369, 370, 371 and 372.....	dis 60
Paragon, Nos. 373, 374, 375 and 376.....	dis 60
Paragon, Nos. 377, 378, 379 and 380.....	dis 60
Paragon, Nos. 381, 382, 383 and 384.....	dis 60
Paragon, Nos. 385, 386, 387 and 388.....	dis 60
Paragon, Nos. 389, 390, 391 and 392.....	dis 60
Paragon, Nos. 393, 394, 395 and 396.....	dis 60
Paragon, Nos. 397, 398, 399 and 400.....	dis 60
Paragon, Nos. 401, 402, 403 and 404.....	dis 60
Paragon, Nos. 405, 406, 407 and 408.....	dis 60
Paragon, Nos. 409, 410, 411 and 412.....	dis 60
Paragon, Nos. 413, 414, 415 and 416.....	dis 60
Paragon, Nos. 417, 418, 419 and 420.....	dis 60
Paragon, Nos. 421, 422, 423 and 424.....	dis 60
Paragon, Nos. 425, 426, 427 and 428.....	dis 60
Paragon, Nos. 429, 430, 431 and 432.....	dis 60
Paragon, Nos. 433, 434, 435 and 436.....	dis 60
Paragon, Nos. 437, 438, 439 and 440.....	dis 60
Paragon, Nos. 441, 442, 443 and 444.....	dis 60
Paragon, Nos. 445, 446, 447 and 448.....	dis 60
Paragon, Nos. 449, 450, 451 and 452.....	dis 60
Paragon, Nos. 453, 454, 455 and 456.....	dis 60
Paragon, Nos. 457, 458, 459 and 460.....	dis 60
Paragon, Nos. 461, 462, 463 and 464.....	dis 60
Paragon, Nos. 465, 466, 467 and 468.....	dis 60
Paragon, Nos. 469, 470, 471 and 472.....	dis 60
Paragon, Nos. 473, 474, 475 and 476.....	dis 60
Paragon, Nos. 477, 478, 479 and 480.....	dis 60
Paragon, Nos. 481, 482, 483 and 484.....	dis 60
Paragon, Nos. 485, 486, 487 and 488.....	dis 60
Paragon, Nos. 489, 490, 491 and 492.....	dis 60
Paragon, Nos. 493, 494, 495 and 496.....	dis 60
Paragon, Nos. 497, 498, 499 and 500.....	dis 60
Paragon, Nos. 501, 502, 503 and 504.....	dis 60
Paragon, Nos. 505, 506, 507 and 508.....	dis 60
Paragon, Nos. 509, 510, 511 and 512.....	dis 60
Paragon, Nos. 513, 514, 515 and 516.....	dis 60
Paragon, Nos. 517, 518, 519 and 520.....	dis 60
Paragon, Nos. 521, 522, 523 and 524.....	dis 60
Paragon, Nos. 525, 526, 527 and 528.....	dis 60
Paragon, Nos. 529, 530, 531 and 532.....	dis 60
Paragon, Nos. 533, 534, 535 and 536.....	dis 60
Paragon, Nos. 537, 538, 539 and 540.....	dis 60
Paragon, Nos. 541, 542, 543 and 544.....	dis 60
Paragon, Nos. 545, 546, 547 and 548.....	dis 60
Paragon, Nos. 549, 550, 551 and 552.....	dis 60
Paragon, Nos. 553, 554, 555 and 556.....	dis 60
Paragon, Nos. 557, 558, 559 and 560.....	dis 60
Paragon, Nos. 561, 562, 563 and 564.....	dis 60
Paragon, Nos. 565, 566, 567 and 568.....	dis 60
Paragon, Nos. 569, 570, 571 and 572.....	dis 60
Paragon, Nos. 573, 574, 575 and 576.....	dis 60
Paragon, Nos. 577, 578, 579 and 580.....	dis 60
Paragon, Nos. 581, 582, 583 and 584.....	dis 60
Paragon, Nos. 585, 586, 587 and 588.....	dis 60
Paragon, Nos. 589, 590, 591 and 592.....	dis 60
Paragon, Nos. 593, 594, 595 and 596.....	dis 60
Paragon, Nos. 597, 598, 599 and 600.....	dis 60
Paragon, Nos. 601, 602, 603 and 604.....	dis 60
Paragon, Nos. 605, 606, 607 and 608.....	dis 60
Paragon, Nos. 609, 610, 611 and 612.....	dis 60
Paragon, Nos. 613, 614, 615 and 616.....	dis 60
Paragon, Nos. 617, 618, 619 and 620.....	dis 60
Paragon, Nos. 621, 622, 623 and 624.....	dis 60
Paragon, Nos. 625, 626, 627 and 628.....	dis 60
Paragon, Nos. 629, 630, 631 and 632.....	dis 60
Paragon, Nos. 633, 634, 635 and 636.....	dis 60
Paragon, Nos. 637, 638, 639 and 640.....	dis 60
Paragon, Nos. 641, 642, 643 and 644.....	dis 60
Paragon, Nos. 645, 646, 647 and 648.....	dis 60
Paragon, Nos. 649, 650, 651 and 652.....	dis 60
Paragon, Nos. 653, 654, 655 and 656.....	dis 60
Paragon, Nos. 657, 658, 659 and 660.....	dis 60
Paragon, Nos. 661, 662, 663 and 664.....	dis 60
Paragon, Nos. 665, 666, 667 and 668.....	dis 60
Paragon, Nos. 669, 670, 671 and 672.....	dis 60
Paragon, Nos. 673, 674, 675 and 676.....	dis 60
Paragon, Nos. 677, 678, 679 and 680.....	dis 60
Paragon, Nos. 681, 682, 683 and 684.....	dis 60
Paragon, Nos. 685, 686, 687 and 688.....	dis 60
Paragon, Nos. 689, 690, 691 and 692.....	dis 60
Paragon, Nos. 693, 694, 695 and 696.....	dis 60
Paragon, Nos. 697, 698, 699 and 700.....	dis 60
Paragon, Nos. 701, 702, 703 and 704.....	dis 60
Paragon, Nos. 705, 706, 707 and 708.....	dis 60
Paragon, Nos. 709, 710, 711 and 712.....	dis 60
Paragon, Nos. 713, 714, 715 and 716.....	dis 60
Paragon, Nos. 717, 718, 719 and 720.....	dis 60
Paragon, Nos. 721, 722, 723 and 724.....	dis 60
Paragon, Nos. 725, 726, 727 and 728.....	dis 60
Paragon, Nos. 729, 730, 731 and 732.....	dis 60
Paragon, Nos. 733, 734, 735 and 736.....	dis 60
Paragon, Nos. 737, 738, 739 and 740.....	dis 60
Paragon, Nos. 741, 742, 743 and 744.....	dis 60
Paragon, Nos. 745, 746, 747 and 748.....	dis 60
Paragon, Nos. 749, 750, 751 and 752.....	dis 60
Paragon, Nos. 753, 754, 755 and 756.....	dis 60
Paragon, Nos. 757, 758, 759 and 760.....	dis 60
Paragon, Nos. 761, 762, 763 and 764.....	dis 60
Paragon, Nos. 765, 766, 767 and 768.....	dis 60
Paragon, Nos. 769, 770, 771 and 772.....	dis 60
Paragon, Nos. 773, 774, 775 and 776.....	dis 60
Paragon, Nos. 777, 778, 779 and 780.....	dis 60
Paragon, Nos. 781, 782, 783 and 784.....	dis 60
Paragon, Nos. 785, 786, 787 and 788.....	dis 60
Paragon, Nos. 789, 790, 791 and 792.....	dis 60
Paragon, Nos. 793, 794, 795 and 796.....	dis 60
Paragon, Nos. 797, 798, 799 and 800.....	dis 60
Paragon, Nos. 801, 802, 803 and 804.....	dis 60
Paragon, Nos. 805, 806, 807 and 808.....	dis 60
Paragon, Nos. 809, 810, 811 and 812.....	dis 60
Paragon, Nos. 813, 814, 815 and 816.....	dis 60
Paragon, Nos. 817, 818, 819 and 820.....	dis 60
Paragon, Nos. 821, 822, 823 and 824.....	dis 60
Paragon, Nos. 825, 826, 827 and 828.....	dis 60
Paragon, Nos. 829, 830, 831 and 832.....	dis 60
Paragon, Nos. 833, 834, 835 and 836.....	dis 60
Paragon, Nos. 837, 838, 839 and 840.....	dis 60
Paragon, Nos. 841, 842, 843 and 844.....	dis 60
Paragon, Nos. 845, 846, 847 and 848.....	dis 60
Paragon, Nos. 849, 850, 851 and 852.....	dis 60
Paragon, Nos. 853, 854, 855 and 856.....	dis 60
Paragon, Nos. 857, 858, 859 and 860.....	dis 60
Paragon, Nos. 861, 862, 863 and 864.....	dis 60
Paragon, Nos. 865, 866, 867 and 868.....	dis 60
Paragon, Nos. 869, 870, 871 and 872.....	dis 60
Paragon, Nos. 873, 874, 875 and 876.....	dis 60
Paragon, Nos. 877, 878, 879 and 880.....	dis 60
Paragon, Nos. 881, 882, 883 and 884.....	dis 60
Paragon, Nos. 885, 886, 887 and 888.....	dis 60
Paragon, Nos. 889, 890, 891 and 892.....	dis 60
Paragon, Nos. 893, 894, 895 and 896.....	dis 60
Paragon, Nos. 897, 898, 899 and 900.....	dis 60
Paragon, Nos. 901, 902, 903 and 904.....	dis 60
Paragon, Nos. 905, 906, 907 and 908.....	dis 60
Paragon, Nos. 909, 910, 911 and 912.....	dis 60
Paragon, Nos. 913, 914, 915 and 916.....	dis 60
Paragon, Nos. 917, 918, 919 and 920.....	dis 60
Paragon, Nos. 921, 922, 923 and 924.....	dis 60
Paragon, Nos. 925, 926, 927 and 928.....	dis 60
Paragon, Nos. 929, 930, 931 and 932.....	dis 60
Paragon, Nos. 933, 934, 935 and 936.....	dis 60
Paragon, Nos. 937, 938, 939 and 940.....	dis 60
Paragon, Nos. 941, 942, 943 and 944.....	dis 60
Paragon, Nos. 945, 946, 947 and 948.....	dis 60
Paragon, Nos. 949, 950, 951 and 952.....	dis 60
Paragon, Nos. 953, 954, 955 and 956.....	dis 60
Paragon, Nos. 957, 958, 959 and 960.....	dis 60
Paragon, Nos. 961, 962, 963 and 964.....	dis 60
Paragon, Nos. 965, 966, 967 and 968.....	dis 60
Paragon, Nos. 969, 970, 971 and 972.....	dis 60
Paragon, Nos. 973, 974, 975 and 976.....	dis 60
Paragon, Nos. 977, 978, 979 and 980.....	dis 60
Paragon, Nos. 981, 982, 983 and 984.....	dis 60
Paragon, Nos. 985, 986, 987 and 988.....	dis 60
Paragon, Nos. 989, 990, 991 and 992.....	dis 60
Paragon, Nos. 993, 994, 995 and 996.....	dis 60
Paragon, Nos. 997, 998, 999 and 1000.....	dis 60

Helisting Apparatus.....		
"Moore's" Hand Helist, with Lock Brake.....	dis 70	
"Moore's" Differential Pulley Block.....	dis 40	
Holders, File and Teel.....		
Rail Pat. Nicholson File Holders.....	dis 25	
Nicholson File Holders.....	dis 20	
Hollow-Ware.....		
Stove Hollow-Ware, Ground.....	dis 60	10 @ 60
Stove Hollow-Ware, Unground.....	dis 70	10 @ 70
Enameled and Tinned Hollow-Ware.....	dis 70	10 @ 70
Kettles.....		
Oval Boilers, Saucepans & Grue Pots.....	dis 70	10 @ 70
Wire Enameled Ware.....	dis 40	10 @ 40
Agate and Granite Ware.....	dis 25	10 @ 25
Rustless Hollow-Ware.....	dis 50	10 @ 50
Galvanized Tea-Kettles.....	dis 50	10 @ 50
Each.....	dis 50	10 @ 50
Stove Plates, 4 mo. or 5 cash in 30 days.....	dis 40	10 @ 40
Meriden Britannia Co.....	dis 40	10 @ 40
Simpson, Hall, Miller & Co.....	dis 40	10 @ 40
Rogers & Brother.....	dis 40	10 @ 40
Hartford Silver Plate Co.....	dis 40	10 @ 40
William Rogers Mfg. Co.....	dis 40	10 @ 40
Hooks.....		
Cost Iron.....	dis 40	10 @ 40
Bird Cage, Sargent's list.....	dis 40	10 @ 40
Bird Cage, Reading.....	dis 40	10 @ 40
Clothes Line, Sargent's list.....	dis 40	10 @ 40
Clothes Line, Reading list.....	dis 40	10 @ 40
Celling, Sargent's list.....	dis 40	10 @ 40
Hallings, Reading list.....	dis 40	10 @ 40
Coat and Hat, Sargent's list.....	dis 40	10 @ 40
Coat and Hat, Reading.....	dis 40	10 @ 40
Wrought Iron.....		
Cotton.....	dis 40	10 @ 40
Cotton Pat. (N. Y. Mallet & Handle Wm).....	dis 40	10 @ 40
Tassel and Picture (T. & S. Mfg. Co.).....	dis 40	10 @ 40
Benches, Scales, Hooks, &c.....	dis 40	10 @ 40
Benches Hooks.....	dis 40	10 @ 40
Wire.....		
Wire Coat and Hat, Gem, list April, 1884.....	dis 45	10 @ 45
Wire Coat and Hat, Milles, list April, 1884.....	dis 45	10 @ 45
Indestructible Coat and Hat.....	dis 45	10 @ 45
Wire Coat and Hat, Standard.....	dis 45	10 @ 45
Belt.....	dis 75	10 @ 75
Brass.....	dis 80	10 @ 80
Whitmore Patent.....	dis 80	10 @ 80
Hooks and Eyes—Malleable Iron.....	dis 70	10 @ 70
Hooks and Eyes—Brass.....	dis 60	10 @ 60
Fish Hooks, American.....	dis 50	10 @ 50
Horse Nails.....		
No. 6 7 8 9 10.....	dis 40	10 @ 40
Unusable.....	dis 40	10 @ 40
Pilinton, Fin. 24 25 26 27 28 29.....	dis 40	10 @ 40
Emery.....	dis 40	10 @ 40
Yara.....	dis 40	10 @ 40
Snowden.....	dis 40	10 @ 40
Truman.....	dis 40	10 @ 40
Yulan.....	dis 40	10 @ 40
Northwest.....	dis 40	10 @ 40
Shope.....	dis 40	10 @ 40
L. O.....	dis 40	10 @ 40
R. K.....	dis 40	10 @ 40
Chapman.....	dis 40	10 @ 40
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Chapman.....	dis 40	10 @ 40
Chapman.....	dis 40	10 @ 40
Chapman.....	dis 40	10 @ 40

Pennsylvania.....	dis 40@105
No. 1.....	1 3 8 00
dos.....	\$24.00 33.00 28.00
Miss' Challenge, No. 1.....	40.00-45@105
Home No. 1.....	\$25 30 40-45@105
Draw Cut, No. 1.....	\$25 30 40-45@105
Each.....	\$50.00 75.00 80.00 25@25
Beef Shavers (Enterprise Mfg. Co.).....	dis 20@10 30
Chadborn's Smoked Beef Cutter.....	dos 30@100

Hinges, Knives.....	dis 40@105
Am. Qd quality, 7 gro, 1 blade, 57; 3 blades, 513; 3 blades, 513.....	dis 20@10 30
Lothrop's.....	dis 20@10 30
Smith's, 7 gro, Single, \$5.00; Double, \$5.....	dis 40@45
Knapp & Cowles.....	dis 50@100 40
Buffalo Adjustable.....	dos 30@10 25

Melasses Gates—Stebbins Pat.....	dis 70@70 & 71 1/2
Stebbins' Genuine.....	dis 60@10 10
Stebbins' Tinned Ends.....	dis 40@10 10
Chase's Hard Metal.....	dis 50@10 10
Smith's.....	dis 80
Woolen's Pattern.....	dis 60@10 10
Wood's.....	dis 50@10 10
Box Nos.....	1 3 8 00 2.00 4.00 7.00 dos, dis 60@10 10

Money Drawers.....	dos 15 @ 20.
Muzzies—Safety, 7 dos.....	dis 25

Nails.....	See Trade Report
Wire Nails & Brads, list July 14, 87, dis 70@71 1/2	
Wire Nails, Standard Penny.....	keg, \$2.55 @ \$2.65

Wall Puller—Curtis Hammer.....	dos 30.00 net
Hammer, No. 1.....	dos 30.00, dis 10
Pollock.....	dos 30.00, dis 25
Boat.....	dos 30.00, dis 30

Nail Sets—Square.....	gro, \$4.00 @ \$4.25
Round.....	gro, \$3.25
Cannon's Diamond Point.....	gro, \$12 dis 20

Nut Crackers.....	dis 40
Table (Humason & Beckley Mfg. Co.).....	dis 40
Blake's Pattern.....	dos 30.00, dis 10
Turner & Seymour Mfg. Co.....	dis 50

Nuts.....	dis 50
Nuts, all kinds, 54¢ off list Jan. 1, 1888.	
In lots less than 100 lb, 7¢, add 1/4¢, 1 lb boxes add 1¢	
to list.	

Oakum.....	dos 70
Government.....	dos 70
U. S. Navy.....	dos 70
Navy.....	dos 70

Oilers—Zinc and Tin.....	dis 65 @ 65@10 10
Brass and Copper.....	dis 60@10 10
Valuable, Hammers' Improved, No. 1, \$3.50; No. 2, \$4.00; No. 3, \$4.40	dos
Valuable, Hammers, Old Pattern, same list.....	dis 40
Prior's Patent or "Paragon" Brass.....	dis 60@10 10
Prior's Patent or "Paragon" Brass.....	dis 60
Oliver's Tin and Zinc.....	dis 60
Oliver's Tin and Zinc.....	dis 60
Broughton's Brass and Copper.....	dis 60
Broughton's Brass.....	dis 60

Packing, Steam.....	dis 60@10 10
Subber.....	dis 60@10 10
Standard.....	dis 60@10 10
Extra.....	dis 60@10 10
N. Y. B. & P. Co., Standard.....	dis 60@10 10
N. Y. B. & P. Co., Empire.....	dis 70
N. Y. B. & P. Co., Salamander.....	dis 80
Jenkins' Standard.....	dos 65, dis 35

Miscellaneous.....	dis 60@10 10
American Packing.....	10¢ @ 11¢
Russia Packing.....	14¢
Italian Packing.....	14¢
Cotton Packing.....	15¢ @ 17¢
Jute.....	7¢ @ 8¢
Padlocks—See Locks.....	

Pails.....	dis 60@10 10
Sealed Iron.....	dis 60@10 10
Quarts.....	10 13 14
Hill's Light Weight, 7 dos.....	\$3.75 3.00 3.25
Hill's Heavy Weight, 7 dos.....	3.00 3.25 3.75
Whiting's.....	2.75 3.00 3.25
Sidney Shepard & Co.....	2.67
Iron Clad.....	2.75 3.00 3.25
Fire Buckets.....	2.75 3.25 3.50
Buckets, see Wall Buckets.....	

Indurated Fibre Ware.....	dos 24.50
Star Falls, 12 qt.....	dos 24.50
Fire, Stable and Milk, 14 qt.....	dos 25.50
Comella's Faber's Carpenters.....	high list, dis 50
Faber's Round Gilt.....	gro 35.25 net
Dixon's Lead.....	gro 34.50 net
Dixon's Lumber.....	gro 37.75 net
Dixon's Carpenters.....	dis 40@10 5

Pails.			
Galvanised Iron—			
Quarts.....	10	12	14
Hill's Light Weight, 7 doz.....	\$3.75	\$4.00	\$4.25

Mouse, Delusion.....? gross \$18.00, dis 15
Rat, "Decey".....? gross \$10.00, do 10
Cyclone.....? gross \$6.25
Hotchkiss Metallic Mouse, 6-hole traps....? dos 90¢
In full cases.....do 75¢

Trawels.
Lotthrop's Brick and Plastering.....dis 25 ¢
Reed's Brick and Plastering.....dis 25 ¢
Lick's Brick and Plastering.....dis 25 ¢
Peace's Plastering.....dis 25 ¢
Clement & Maynard's.....dis 25 ¢
Rose's Brick.....do 15 ¢
Brade's Brick.....dis 25 ¢
Worrall's Brick and Plastering.....dis 75 ¢
Gibson's.....do 70 ¢

Tricks.—Butter and Cheese.
Trackus, Warehouse, &c.....dis 25 ¢

B. & L. Block Co.'s list, 1882.....dis 40 ¢

Tubes. Bellier.—See Pipe Twine.

No. 9, Flat Twine, $\frac{1}{2}$ and $\frac{3}{4}$ Balls.....BC. B.
No. 12, " " " " " ".....25¢ 30¢
No. 18, " " and " ".....15¢ 25¢
No. 24, " " and " ".....15¢ 25¢
No. 30, " " and " ".....10¢ 27¢
No. 36, Mattress, " and ".....45¢ 60¢
Chalk Line, Cotton, " B Balls.....25¢
Mason Line, Linen, " ".....do
3-Ply Hemp, $\frac{1}{4}$ and $\frac{1}{2}$ B Balls (Spring Twine).....11¢
3-Ply Hemp, $\frac{1}{4}$ B Balls.....12¢ 13¢
3-Ply Hemp, $\frac{1}{2}$ B Balls.....11¢ 11¢
Cotton Wrapping, 5 Balls to b.....15¢ 16¢
2, 3, 4 and 5 Ply Jute, $\frac{1}{4}$ B Balls.....10¢
Wool.....3¢
Cotton Wops—6, 9, 12 and 15 b to doz.....15¢ 15¢

Vices.
Solid Box.....dis 50¢102½ ¢ 60 ¢

Parallel.
Fisher & Norris Double Screw.....dis 15¢10 ¢
Stephens'.....dis 25 ¢
Parker's.....dis 20 ¢ 25 ¢
Ward's.....dis 25 ¢
Howard's.....dis 40 ¢
Bonney's.....dis 40¢10 ¢
Millers Falls.....dis 40 ¢ 40¢10 ¢
Trenton.....dis 40¢5 ¢ 40¢10 ¢
Merrill's.....dis 15¢20 ¢
Bargen's Union.....dis 60¢102½ ¢
Double Screw Union.....dis 40 ¢
Double Screw Loe.....dis 15¢10 ¢
Prentiss.....dis 20¢5 ¢ 25 ¢
Simpson's Adjustable.....dis 40 ¢

Saw Files.
Bonney's Nos. 2 & 3.....? dos \$15.00, dis 4 ¢ 10 ¢
Stearns' Silem Saw Vices.....dis 35¢42½ ¢ 35¢10¢10 ¢
Sargent's.....dis 60¢102½ ¢
Hopkins'.....? dos \$17.50, dis 10 ¢
Reading.....dis 40¢10 ¢
Wentworth.....dis 20¢10 ¢
Combination Hand Vice.....? gro. 64.00
Co's Cast Steel Vices.....dis 20 ¢
Bauer's Pipe Vices.....dis 20 ¢

Wagon Boxes.
Per lb.....dis 2½ ¢

Wagon Jacks.
Daisy.....? dos \$4.00, dis 25 ¢

Washer Cutters.
Smith's Patent.....? dos \$18.00, dis 40¢102½ ¢
Cox's.....? dos \$11.00, dis 35¢
Penny's.....? dos Fol. \$14; Jan'd, \$18, dis 65 ¢
Appleton's.....? dos \$16.00, dis 60¢10 ¢
Bonney's.....dis 20¢10 ¢

Washers.
size..... $\frac{1}{4}$ 5-16 $\frac{3}{4}$ $\frac{1}{2}$ $\frac{1}{4}$ $\frac{1}{4}$ 1
Fishers.....7 5¼ 4¼ 3¾ 3¼ 3¼ 6¼
to lists less than 200 b, ? b, add $\frac{1}{4}$, 5-b boxes 1¢ to list.

Wedges.—Iron.
Steel.....? b 5½ ¢
Well Buckets, Galvanized.
Hill's.....? dos .12 qt., \$4.25; 14 qt., \$5.25
Do and Do.....? dos, 1¢
Whiting's Flat Iron Band.....? dos \$4.32 ¢ \$4.50
Whiting's Wired Top.....? dos \$4.00 ¢ \$3.25
Well Wheels—8 in., \$2.25; 10 in., \$2.70; 12 in., \$3.25.

Wire.
Iron.
Market Br. & Ann. Nos. 0 to 18.....dis 75¢75¢5 ¢
Market Coppered, Nos. 0 to 18.....dis 70¢70 ¢
Market Galvanized, Nos. 0 to 18.....dis 65¢10 ¢
Market Tin'd Tinned List Nos. 0 to 18.....dis 67½ ¢67½ ¢5 ¢
Stone Br. & Ann'd, Nos. 16 to 18.....dis 72½ ¢5 ¢75 ¢
Stone Bright & Ann'd, Nos. 19 to 20, dis 75¢5 ¢75 ¢
Stone Br. & Ann'd, Nos. 27 to 36, dis 75¢10 ¢75 ¢
Stone Tin'd Tin'd List, Nos. 18 to 36, dis 70¢10 ¢75 ¢
Tinned Broom Wire, Nos. 18 to 24.....dis 72½ ¢75 ¢
Galvanized Fence.....dis 65¢65 ¢5 ¢
Annalee Fence, Nos. 8 to 9.....dis 75¢75 ¢5 ¢
Annalee Grape, Nos. 10 to 12.....dis 75¢75 ¢5 ¢
Braze & Copper, list, Jan. 15, '84.....dis 75 ¢
Brazed Fence.....See Trade Report
Wire on Spools.....dis 65 ¢
Malin's Brass and Tinned Wire on Spools.....dis 50 ¢
Malin's Brass and Copper Wire on Spools.....dis 40 ¢
Cast Steel Wire.....dis 60 ¢
Scrub Steel Wire.....\$6.00 to 2 ¢, dis 50 ¢
Centennial Wire, Nos. 18 to 30.....dis 55 ¢
Picture Wire.....dis 60¢10 ¢
Barb Wire Safety Guards.....? 1000 \$6.00, dis 25 ¢
Wire Clothes Lines, See Lines.

Wire Cloth, Netting, &c.
Painted Screen Cloth, No. 34, ? 100 sq ft.....\$1.20
Painted Screen Cloth, No. 33, ? 100 sq ft.....\$2.00
German Wire Netting.....dis 70¢10 ¢ 75 ¢
Wire Goods.—See Bright Wire Goods.

Wire Rope.—List May 1, 1886.
Wrunches.—American Adjustable.....dis 25 ¢
Baxter's Adjustable "B".....dis 40¢10 ¢ 50 ¢
Baxter's Diagonal.....dis 40¢1 ¢ 50 ¢
Cox's "Mechanics".....dis 55¢102½ ¢
Girard Standard.....dis 70¢10 ¢
Lamson & Sessions' Engineers'.....dis 60¢10 ¢
Lamson & Sessions' Standard.....dis 70¢10 ¢
Girard Agricultural.....dis 80 ¢ 80¢2½ ¢
Lamson & Sessions' Agricultural.....dis 80 ¢
Sterline Wrought.....dis 80 ¢

Bemis & Call's Patent Combination
Bemis & Call's Merrick's Pattern.....dis 35 ¢
Bemis & Call's Rylander's Patte.....dis 25 ¢
Bemis & Call's Cylinder or Gas Pipe.....dis 40¢5 ¢
Cox's Genuine Wire Netting.....dis 35 ¢
Cox's Pocket (Bright).....\$6.00 dis 60¢10 ¢
The Favorite Pocket (Bright).....? dos \$4.00, dis 40 ¢
Webster's Patent Combination.....dis 25 ¢
Boardman's.....dis 2 ¢ 25 ¢
Always Ready.....dis 25 ¢5 ¢
Alligator.....dis 60 ¢
Cambridge Engineer.....dis 50 ¢
Acme, Nigger.....dis 60¢2½ ¢
Acme, Right.....dis 50 ¢
Walker.....dis 55 ¢2½ ¢
Diamond.....dis 40 ¢
Diamond Patent Stee.....dis 40 ¢

Wringers, Cloths.
List Jan. 10, 1886, \$2.00 off.

Wrought Goods.
Staples Hooks, &c., in Jan. 12, '87, dis 80¢20¢80¢25 ¢

CURRENT METAL PRICES.

JULY 18, 1888.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market reports.

IRON AND STEEL.

Bar Iron from Store.

Common Iron:	
1 to 2 in. round and square.	per lb 1.90 @ 2.00¢
1 to 6 in. x 1/2 to 1 in.	
Refined Iron:	
1/2 to 2 in. round and square.	per lb 2.10 @ 2.25¢
1 to 4 in. x 1/2 to 1 in.	
1/2 to 6 in. x 1/2 to 1 in.	
1 to 6 in. x 1/2 and 5-16.	per lb 2.30 @ 2.45¢
Rods 1/2 and 1-16 round and sq.	per lb 2.30 @ 2.35¢
Bands—1 to 6 x 3-16 to No. 12.	per lb 2.30 @ 2.45¢
"Burden Best" Iron, base price.	per lb 3.00 @ ...
Burden's "H. B. & S." Iron, base price.	per lb 2.80 @ ...
"Uster."	per lb 3.10 @ ...
Norway Rods.	per lb 4.00 @ 5.00¢

Merchant Steel from Store.

Open-Hearth and Bessemer Machinery,	
Toe Calk, Tire and Sleigh Shoe, base price in small lots.	2 1/2¢ @ 3¢
Best Cast Steel, base price in small lots.	8 1/2¢ @ 9¢
Best Cast Steel Machinery, base price in small lots.	5 1/2¢ @ 6¢
For Classification and Extras adopted by the Merchant Steel Association of the United States, June 1, 1888, see <i>The Iron Age</i> , June 21, 1888.	

Sheet Iron from Store.

Common American.	R. G. Cleaned.
10 to 16.	per lb 2.75 @ 2.80¢
17 to 20.	per lb 2.85 @ 2.90¢
21 to 24.	per lb 3.00 @ 3.10¢
25 and 26.	per lb 3.20 @ 3.30¢
27.	per lb 3.35 @ 3.37¢
28.	per lb 3.50 @ 3.55¢
B. B.	2d qual.
Galv'd. 14 to 20.	per lb 4.50 @ 4.58¢
Galv'd. 21 to 24.	per lb 4.75 @ 4.75¢
Galv'd. 25 to 26.	per lb 5.25 @ 5.12¢
Galv'd. 27.	per lb 5.62 1/2 @ 5.48¢
Galv'd. 28.	per lb 6.00 @ 5.85¢
Patent Planished.	per lb A 10¢ B 9¢
Russia.	per lb 9 1/4¢ @ 10¢
American Cold Rolled B. B.	per lb 5¢ @ 7¢

English Steel from Store.

Best Cast.	per lb 15¢
Extra Cast.	per lb 16 1/2¢ @ 17¢
Swaged, Cast.	per lb 16¢
Best Double Shear.	per lb 15¢
Blister, 1st quality.	per lb 12 1/2¢
German Steel, Best.	per lb 10¢
2d quality.	per lb 9¢
3d quality.	per lb 8¢
Sheet Cast Steel, 1st quality.	per lb 15¢
2d quality.	per lb 14¢
3d quality.	per lb 12 1/2¢

METALS.

Tin.

Banca, Pigs.	per lb 24¢
Straits, Pigs.	per lb 21¢
English, Pigs.	per lb 23¢
Straits in Bars.	per lb 22¢

Tin Plates.

Charcoal Plates.—Bright.	Per box.
Melyn Grade.	
IC, 10 x 14.	\$6.00
IC, 12 x 18.	6.25
IC, 14 x 20.	6.00
IC, 20 x 28.	12.70
IX, 10 x 14.	7.50
IX, 12 x 18.	7.75
IX, 14 x 20.	7.50
IX, 20 x 28.	15.50
DC, 12 1/2 x 17.	5.50 @ 5.75
DX, 12 1/2 x 17.	7.00 @ 7.25
Calland Grade.	
IC, 10 x 14.	\$6.00
IC, 12 x 18.	6.25
IC, 14 x 20.	6.00
IX, 10 x 14.	7.50
IX, 12 x 18.	7.75
IX, 14 x 20.	7.50
IX, 20 x 28.	15.50
DC, 12 1/2 x 17.	5.00 @ 5.25
DX, 12 1/2 x 17.	6.00 @ 6.25
Allaway Grade.	
IC, 10 x 14.	\$6.25 @
IC, 12 x 18.	5.50 @
IC, 14 x 20.	5.25 @
IX, 10 x 14.	6.25 @
IX, 12 x 18.	6.50 @
IX, 14 x 20.	6.25 @
IX, 20 x 28.	12.50 @
DC, 12 1/2 x 17.	5.00 @
DX, 12 1/2 x 17.	6.00 @

Coke Plates.—Bright.

Steel Coke.—IC, 10 x 14, 14 x 20.	\$4.80 @
10 x 20.	7.50 @
20 x 28.	10.00 @
IX, 10 x 14, 14 x 20.	5.60 @
BV Grade.—IC, 10 x 14, 14 x 20.	4.70 @

Charcoal Plates.—Terne.

Dean Grade.—IC, 14 x 20.	\$4.62 1/2 @
30 x 28.	9.25 @
IX, 14 x 20.	5.62 1/2 @
20 x 28.	11.37 1/2 @
Abecarne Grade.—IC, 14 x 20.	4.50 @
20 x 28.	9.00 @
IX, 14 x 20.	5.50 @
20 x 28.	10.80 @

Tin Boiler Plates.

IX, 14 x 26.	112 sheets @ \$12.50 @ \$12.75
IX, 14 x 28.	112 sheets @ 12.75 @
IX, 14 x 31.	112 sheets @ 14.25 @

Copper.

Duty: Pig. Bar and Ingot, 4¢; Old Copper, 3¢	
per lb. Manufactured (including all articles of which Copper is a component of chief value), 45 ¢ ad valorem	

Ingot.

Lake.	@ 17.50¢
"Anchor" Brand.	@ 17¢

Prices adopted by the Association of Copper Manufacturers of the United States, December 10, 1887, being quotations for all sized lots.

Not wider than	Not longer than	And longer than	Weights per square foot and prices per pound.							
			Over 64 oz.	32 to 64 oz.	16 to 32 oz.	14 to 16 oz.	12 to 14 oz.	10 to 12 oz.	8 to 10 oz.	Less than 8 oz.
30—72	25	25	25	26	27	28	28	31	33	
80—96	25	25	25	26	27	28	28	30	34	
96—96	25	25	25	27	29	31	31	35	38	
48—96	25	25	25	28	30	32	32	36		
60—96	25	25	25	30	32	34	34			
60—96	25	25	25	31	33	35				
84—96	25	25	25	32	34					
84—96	25	25	25	33						
Over 84 in. wide	25	25	25	30						

All Bath Tub Sheets. 16 oz. 14 oz. 12 oz. 10 oz. Per pound. \$0.28 0.30 0.32 0.35
Bolt Copper, 1/2 inch diameter and over, per pound. 25¢

Circles, 60 inches in diameter and less, 3 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles, over 60 inches diameter, up to 96 inches diameter, inclusive, 5 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles, over 96 inches diameter, 6 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Segment and Pattern Sheets, 3 cents per pound advance over price of sheets required to cut them from.

Cold or Hard Rolled Copper, 14 ounces per square foot and heavier, 1 cent per pound over the foregoing prices.

Cold or Hard Rolled Copper, lighter than 14 ounces per square foot, 2 cents per pound over the foregoing prices.

Copper Bottoms, Pits and Flats.

Per pound.

14 ounce to square foot and heavier. 2¢

12 ounce and up to 14 ounce to square foot. 2 1/2¢

10 ounce and up to 12 ounce. 3 1/2¢

Circles less than 8 inches diameter 2 cents per pound additional.

Circles over 13 inches diameter are not classed as Copper Bottoms.

Tinning.

Tinning sheets on one side, 10, 12 and 14 x 48.

each. 8¢

Tinning sheets on one side, 30 x 60 each. 30¢

For tinning boiler sizes, 9 in. (sheets 14 in. x 60 in.), each. 15¢

For tinning boiler sizes, 8 in. (sheets 14 in. x 56 in.), each. 12¢

For tinning boiler sizes, 7 in. (sheets 14 in. x 52 in.), each. 12¢

Tinning sheets on one side, other sizes, per square foot. 1 1/2¢

For tinning both sides double the above prices.

Planished Copper.

Planished Copper List May 5, 1888. Net

Brass and Copper Tubes.

Seamless Copper.

1/2 inch per lb. 50¢

3/4 inch per lb. 44¢

1 inch per lb. 40¢

1 1/4 inch per lb. 38¢

1 3/4 inch per lb. 37¢

2 inch per lb. 34¢

2 1/2 inch per lb. 31¢

3 inch per lb. 28¢

3 1/2 inch per lb. 25¢

4 inch per lb. 22¢

4 1/2 inch per lb. 20¢

5 inch per lb. 18¢

5 1/2 inch per lb. 16¢

6 inch per lb. 14¢

6 1/2 inch per lb. 12¢

7 inch per lb. 10¢

7 1/2 inch per lb. 8¢

8 inch per lb. 6¢

8 1/2 inch per lb. 4¢

9 inch per lb. 3¢

9 1/2 inch per lb. 2¢

10 inch per lb. 1¢

10 1/2 inch per lb. 1¢

11 inch per lb. 1¢

11 1/2 inch per lb. 1¢

12 inch per lb. 1¢

12 1/2 inch per lb. 1¢

13 inch per lb. 1¢

13 1/2 inch per lb. 1¢

14 inch per lb. 1¢

14 1/2 inch per lb. 1¢

15 inch per lb. 1¢

15 1/2 inch per lb. 1¢

16 inch per lb. 1¢

16 1/2 inch per lb. 1¢

17 inch per lb. 1¢

17 1/2 inch per lb. 1¢

18 inch per lb. 1¢

18 1/2 inch per lb. 1¢

19 inch per lb. 1¢

19 1/2 inch per lb. 1¢

Corporation Cocks, "Mueller" Pattern, from

Western list. 55¢10¢2

Ground Basin and Shampooing Cocks. 10¢10¢2

Compression Basin Cocks. 50¢10¢2

Compression Basin and Sink Cocks. 50¢10¢2

Compression Pantry Cocks. 50¢10¢2

Compression Double Basin and Shampooing Cocks. 50¢10¢2

Compression Double Bath Cocks. 50¢10¢2

Compression Bibbs, Urinal Cocks, Sill Cocks, Stops, Hopper Cocks, Hydrant Cocks and Ball Cocks. 50¢10¢2

Basin Plugs and Basin Grates. 55¢10¢2

Bath and Wash Tray Plugs. 55¢10¢2

Bath Wastes and Washers, Bath and Basin Valves, Sewer and Vacuum Valves, Cistern Valves, Pump Valves and Strainers, Ship Closet Valves and Suction Baskets. 55¢10¢2

Basin Clamps, Basin Joints and Strainers. 55¢10¢2

Boiler Couplings, Ground Face, per set \$1.25. 10¢

Boiler Couplings, Plain Face, per set \$1.30. 10¢

Water Back Valve and Plain Couplings, Soldering Nipples and Unions. 55¢10¢2

Union Joints. 50¢10¢2

Hydrant Nozzles, Handles and Guides, Sockets and Clamps, Street Washer Screws and Guides. 55¢10¢2

Hose Goods. 55¢10¢2

Steam and Gas Fitters' Brass and Iron Work.

Discount per cent.

Brass Globe Valves. 60¢10¢2

Finished Brass Globe Valves, with Finished Brass Wheels. 40¢10¢2

Brass Globe Valves, with Patent Wood Wheels. 60¢10¢2

Brass Globe Angle and Corner Valves. 60¢10¢2

Brass Radiator Angle Valves. 60¢10¢2

Brass Radiator Angle Valves, Frink's Patent. 60¢10¢2

Brass Cross and Check Valves. 60¢10¢2

Brass Check Valves. 60¢10¢2

Brass Hose Valves. 60¢10¢2

Brass and Iron Frink Valves. 60¢10¢2

Brass Safety Valves. 60¢10¢2

Brass Vacuum Valves. 60¢10¢2

Brass Whistle Valves. 60¢10¢2

Brass Balance, Back Pressure and Foot Valves. 60¢10¢2

Brass Butterfly and Throttle Valves. 60¢10¢2

Brass Pump Valves. 60¢10¢2

Brass Steam Cocks. 57¢10¢2

Brass Service, Meter and Union Cocks. 57¢10¢2

Brass Whistles, Water Gauges and Oil Cups. 60¢10¢2

Brass Hollow Plug, Tallow and Globe Oil Cups. 60¢10¢2

Brass Lubricators. 60¢10¢2

Brass Air Valves. 60¢10¢2

Brass Air Cocks. 60¢10¢2

Brass Gauge Cocks. 55¢10¢2

Brass Cylinder Cocks and Steam Bibbs. 50¢10¢2

Brass Swing Joints and Expansion Joints. 50¢10¢2

Brass Test Pumps. 50¢10¢2

Brass Steam Fittings, Rough. 60¢10¢2

Brass Steam Fittings, Finished. 60¢10¢2

Brass Union Joints. 60¢10¢2

Brass Soldering Unions and Nipples. 55¢10¢2

Brass Hose Fittings, Fusible and Boiler Plug. 55¢10¢2

Iron Body Globe, Angle, Cross and Check Valves. 65¢10¢2

Iron Body Safety, Throttle, Back Pressure, Butterfly and Foot Valves. 65¢10¢2

Iron Cocks, all Iron. 65¢10¢2

All Iron Valves. 65¢10¢2

Miscellaneous.

Discount per cent.

Cast Iron Fittings. 70¢10

Plugs and Bushings. 75¢10

Malleable Iron Unions. 67¢

Malleable Iron Fittings. 75¢

THE IRON AGE

THURSDAY, JULY 26, 1888.

The Bartlett Propeller.

Marine engineers particularly will be interested in the new form of screw propeller illustrated on this page, and designed by John E. T. Bartlett, of 253 West Fourteenth street, New York. During a recent visit to the Delamater Iron Works, where the propeller is turned out for Mr. Bartlett, who, we should add, is connected

distance from the axis. Local surface disturbance and currents were also to be avoided, all of which requirements seem to be met by the helicoidal parabolic surface of revolution which Mr. Bartlett adopted. It will be observed in Fig. 5 that a plane passed through the axis of the propeller shaft will intersect the blade of his design in a parabolic curve. This is designated by the figures 2, 0, 2 in Fig. 1.

pitch of the propeller. In Fig. 5 the lines *s s* indicate the flow of water to the wheel, partaking as it does of the contour of the run of the ship, as is actually the case in practice. After the particles of water have passed behind the blades the wheel will drive them, as previously stated, in a direction parallel to the axis of the shaft. The reason is readily apparent. The motion must be in either

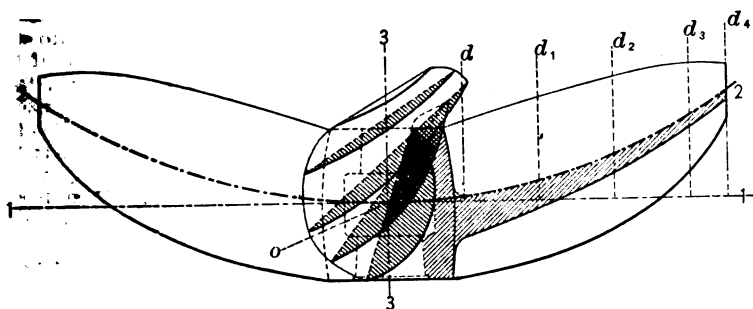


Fig. 1.—Section and Plan.

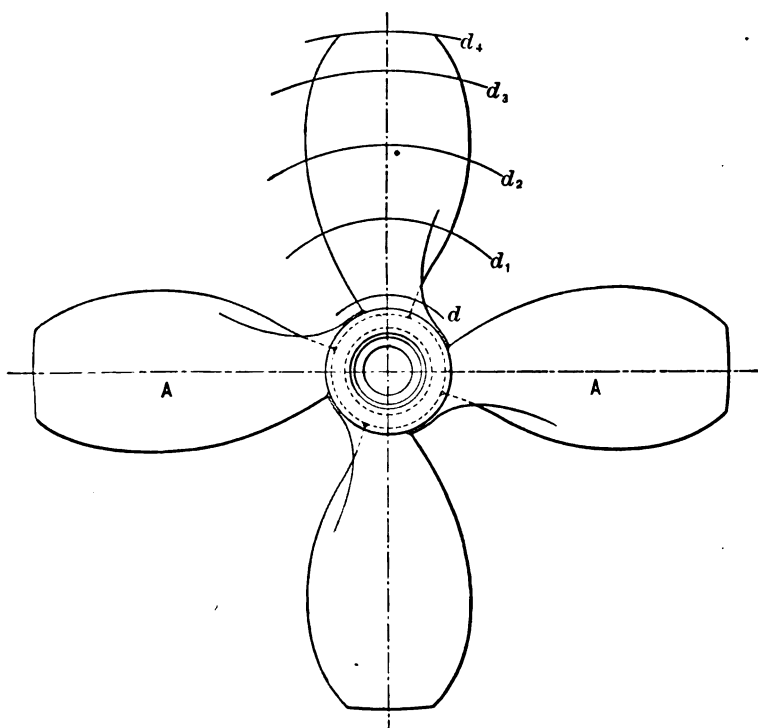


Fig. 2.—Front Elevation Looking Aft.

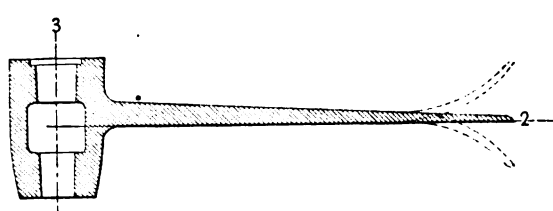


Fig. 3.—Section through Blade of Common Propeller.

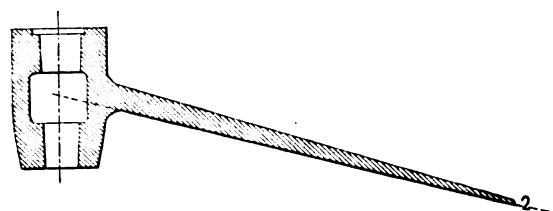


Fig. 4.—Section through Blade of Centripetal Propeller.

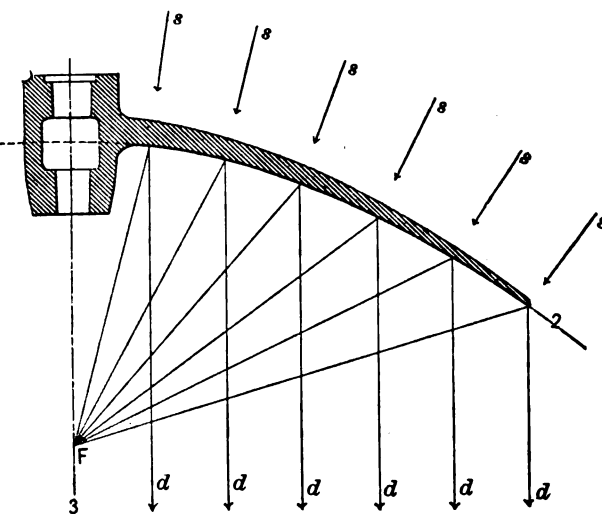


Fig. 5.—Section through Blade of Bartlett Propeller.

IMPROVED FORM OF SCREW PROPELLER, BUILT FROM DESIGNS BY J. E. T. BARTLETT, NEW YORK.

professionally with the works, we had an opportunity of examining more closely the features of the design; in the main these are very well represented in our engravings.

The improvement, as a glance will show, is in the shape of the propelling surface of the wheel blades, the aim being to give the water driven astern a direction parallel to the axis of the driving shaft, and also to prevent the water from being raised by the centrifugal force generated by the angular velocity of the propeller. Mr. Bartlett sought further to gain length of blade with given diameter, and to thus diminish the frictional resistance to be overcome by the engine in rotating the wheel at a given angular velocity. This resistance increases as the square of the

The base line of abscissae, marked 1, 0, 1, for determining the curve is assumed to pass through the center line 3 3 of the shaft, and midway of the length of the propeller hub. As many ordinates as may be necessary for accuracy in determining the curve are calculated, with the varying diameter values *d*, *d*₁, *d*₂, *d*₃, &c., using the parabolic formula $h = \frac{d^2}{x^2} \cdot \frac{1}{f}$, *h* representing the value of one ordinate, *f* the focal distance and *x* a constant. The driving surface will be a parabolic surface generated by the revolution of a semi-parabola, 0 2, whose vertex is 0, around the longitudinal axis 0 3, having at the same time a motion of translation, positive or negative, in the direction 0 3, equal to the required

one of two directions in virtue of the influence of a parabolic reflecting surface, and, as the water is incompressible, it cannot be forced to the focus *F*, and must, therefore, follow the lines *d d*. Mr. Bartlett explains that the air in the water behind the wheel will be compressed so that the latter will work in solid water, and less vibration will be occasioned by it than by other forms. The driving surface will act on the same principle as sound and light reflectors similarly constructed. Any particle of fluid passing behind the leading edge *A* of the propeller-blade will be forced back by the advancing surface of the propeller and the superposed particles prevented following or flowing off the blades by the reflect-

ing surface. Before any particle can acquire centrifugal force from contact with a rotating surface of high velocity it will have been left behind by the advancing propeller. Having no tendency to rise to the surface it will be reflected parallel to the axis of the shaft, as the least resistance is in the direction of the wake of the vessel. The increase in length of blades is clearly shown on the right-hand blade, Fig. 1, the length gained being the difference in length of the curved line 0 2 and the straight line 0 1.

Mr. Bartlett claims that the propelling surfaces which he adopts prevent the water from flowing off radially or tangentially, and that hence there are no waves on the surface caused by the rotation of the wheel. There would consequently be no tendency to wash away banks or scour the bottoms of waterways of small sectional area. We understand that trials with the propeller on several launches have shown it to give an appreciable increase of speed over that attained by the ordinary form of wheel, and to make as little commotion in the wake as is produced by the passage of a vessel under sail. The importance attached to both these points need not be emphasized. At present preparations are being made for fitting up a wheel for a 60-foot launch for the New York *World*, and the performance of the boat will be watched with interest.

The Russian Oil Pipe Line.

Referring to the contemplated construction of the Russian crude oil pipe line from Baku to Batoum, we find the following in *Engineering*, of London:

The promoters of the scheme are understood to have failed in their attempts to obtain funds for its construction in Paris, and of course, in the present condition of European politics, they are not very likely to be more successful at Berlin. The sum required for the undertaking is large—about £2,000,000—and the enterprise is handicapped by the fact that all the pipes must be manufactured in Russia, notwithstanding that at the present moment no pipe works exist there capable of turning out a short pipe line, let alone one 600 miles long. What has, however, chiefly impeded the success of the scheme up to now has been the bitter enmity of the Nobel firm, whose influence against it has been extended even to financial quarters. The Nobel firm carry on their refining operations at Baku, where they possess one of the largest, if not the largest, refinery in the world, and they have always opposed the laying down of a pipe line that would allow of petroleum being pumped in a crude condition to Batoum, and refined there under far more advantageous conditions than is possible at Baku. On this account, seeing their interests at Baku are imperiled by the crude pipe line scheme, they have maintained against it a war to the knife, and sought to promote instead a kerosene pipe line, or a pipe line that would pump only the refined product from Baku to the Black Sea.

In connection with this, we stated some time ago that it had scored an advantage by obtaining permission to put down the first section of the kerosene pipe line across the Suram Pass. Financial arrangements were being made to carry this through when Mr. Ludwig Nobel suddenly died. The result of this has been a check to the kerosene pipe line scheme also, and there is no present prospect of either it or the rival project being promptly carried out. Probably as soon as the Nobel firm is placed under new leadership, the kerosene pipe line will come to the front again, particularly as there are no onerous conditions attaching to its construction, and the demand for it is pressing on the part of the

oil exporters at Baku. With regard to the crude oil scheme the largeness of the sum required is a serious obstacle, and we should not feel surprised if the Elimoff concession fell through. This would not imply an abandonment of the idea on the part of Russia. On the contrary, the Government, in that case, would probably decline to construct it itself. From next January the Transcaucasian Railway from Baku to Batoum will become a State undertaking, and the construction of a pipe line would fall naturally to the control of a State department managing the petroleum traffic on the railway.

Monster Bridge Project.

New York City has been startled by the sudden introduction in Congress of a bill providing for the construction of an enormous suspension bridge across the River, between New York City and the North New Jersey shore. The bill referred to was introduced into the House June 27 by Mr. Cox, and is identical with that introduced in the Senate July 2 by Mr. Quay. The scheme is a most formidable one, as the proposed bridge, according to the designs of Gustav Lindenthal, the bridge builder of Pittsburgh, Pa., will cross the river in a single span 2860 feet in length, which is 1310 feet longer than that of the Brooklyn Bridge, and the weight of materials used must necessarily be more than double, far surpassing in all respects any similar structure now extant. The entire cost of such a work can only be estimated from imperfect data, as a difference of several millions must depend on the final choice of a terminus on the New York side, but, while the projectors of the scheme claim that \$16,000,000 will suffice, other engineers, perhaps not less competent, have named as high a figure as \$40,000,000. The plan is now on exhibition in the rooms of the House Committee on Commerce at Washington, and the incorporators named are: James King McLanahan, Jordan L. Mott, Henry Flad, J. Canda, James Andrews, Thomas F. Ryan, Gustav Lindenthal and William F. Shunk. All the parties are well known and peculiarly responsible. Jordan L. Mott is the large iron manufacturer of this city. James King McLanahan is a wealthy iron manufacturer of Hollidaysburg and Johnstown, Va. Henry Flad is president of the Board of Public Improvements of the city of St. Louis, was intimately connected with Captain Eads in the construction of the St. Louis Bridge, and was formerly president of the American Society of Civil Engineers. Charles J. Canda is the vice-president of the Western National Bank, of this city, and was formerly United States Assistant Treasurer here. James Andrews is a contractor of repute. He built the piers of the St. Louis Bridge and the works at the jetties of the Mississippi River. He is the successor of Captain Eads in the Tehuantepec Ship Railway project. William F. Shunk is a civil engineer, who was formerly chief engineer of the New York Elevated Railroad. Thomas F. Ryan is a banker of this city, of the firm of Smith, Oakman & Ryan. The author and projector of the proposed bridge, Gustav Lindenthal, is a member of the American Society of Civil Engineers, and his name is already identified with several important works in various parts of the country. Three of the bridges at Pittsburgh are evidences of his skill.

The bill authorizes the persons above named and their associates to build and operate a bridge across the Hudson River for the passage of railroad trains and other purposes, provided that said bridge shall be constructed with a single span over the entire river between the established pier lines in either State, and at an elevation over the river of at least 140 feet in the

clear above the level of ordinary high water, and that this minimum height shall be exclusive of the deflections of the superstructure from loads or temperature effects, and that no pier or piers or other obstructions to navigation, either of a temporary or permanent character, shall be placed or built in the river between said pier lines under this act. It is further stipulated that all railroad companies desiring to use the bridge shall be entitled to equal rights and privileges "for a reasonable compensation." The diagrams of Mr. Lindenthal's bridge indicate a structure in its main features similar to the East River bridge, except that there are double cables, one set below the other. There is a double tower on either side of the Hudson, with a single span suspended from gracefully bending cables. The length of the middle span is to be 2850 feet from center to center of the towers, and the length of the end spans 1500 feet each, making a total length, including the anchorages, of nearly 6500 feet. The towers are to be 500 feet high and will stand on masonry piers 840 by 180 feet, 25 feet high above high water, with foundations on rock. The towers will be of wrought iron and steel, containing 16 columns each. These columns are to be composed of angles and plates, all octagonal in shape and tapering from 7 feet in diameter at the base to 5 feet at the top. The columns are to be strongly braced together inside with heavy bracing and outside with lattice filling. The anchorages are to be each 320 by 180 feet and 210 feet high above high-water line. The six railroad tracks pass through a tunnel in each anchorage. The cables are to be 50 feet apart, strongly braced together to resist the deforming effects of heavy loads. Each cable will have a diameter of 4 feet. The steel wires forming the cables are to be inclosed in steel envelopes to protect them against the weather. An air space of 2 inches is to be left between the steel envelopes and the wire, for the better protection against the heating of the sun and to prevent unequal temperature effects. The designer says that in ordinary travel the proposed bridge would be strained only to about 10 per cent. of the maximum load for which it is designed.

It will be observed that the single span sustained by piers to be kept within the pier line, with a maximum height of 140 feet above ordinary high water, at once disarms all hostile objection. The one question to be determined is the feasibility of the undertaking. This settled, the approval of the Secretary of War will be only a formal act. That eventually the Hudson River will be bridged for commercial purposes as completely as is the Thames, at London, cannot be doubted. It remains to be seen to what extent it may be necessary to utilize the rocky bluffs on either side in securing the desired elevation.

Portable Rail Saw.—Messrs. Manning, Maxwell & Moore, 111 Liberty street, New York, are putting on the market a portable rail saw designed by Mr. E. C. Smith, of Brooklyn. A machine was made by Mr. Smith early in 1885 with which he cut a 60 pound rail in 35 minutes. As improved and now put on the market, it is said to be capable of cutting a 70 pound rail from 10 to 12 minutes. It will cut off a section as thin as $\frac{1}{4}$ inch, leaving the end of the rail smooth and true. Those who have used the saw speak well of it. It is operated by hand by means of two levers on opposite sides of a pivoted frame in which the saw blade is fastened. The feed is automatic. The blade is carried on pins in the frame.

The Baker Engine and Machine Company, of Geneva, Ohio, have been incorporated, with a capital stock of \$100,000.

New Beading Machine.

Manufacturers of Russia iron stove bodies and other similar articles of a cylindrical shape have experienced much difficulty heretofore in making bands of fancy embossed work, with a clear and sharp impression. The machines used for this work have not been sufficiently heavy to bring about satisfactory results. These difficulties have been completely overcome by the recent introduction of a powerful beading machine, illustrated on this page, valuable for beading, swedging and embossing sheet iron, stove bodies, stove-pipe, powder kegs and other articles of a like character. It is made by the E. W. Bliss Company, of Brooklyn, N. Y., and weighs about 800 pounds. The beading or embossing rolls are fitted on the outer

The break in the main was known to be between the banks of the river. A solution of bi-permanganate of potash was introduced at a hydrant on the side of the river nearest the reservoir, and observers were stationed on the river along the line of the main. A deep reddish purple discoloration of the river water at one point soon made the exact location of the leak apparent.

The Monitors.

One of the officers of the U. S. Steamship Boston, writing to the New York Times recently on the United States Navy, refers in the following interesting manner to the monitors:

Notwithstanding all the inventions and improvements in naval warfare during the

monitor type may still hold its own against the most powerful ordnance.

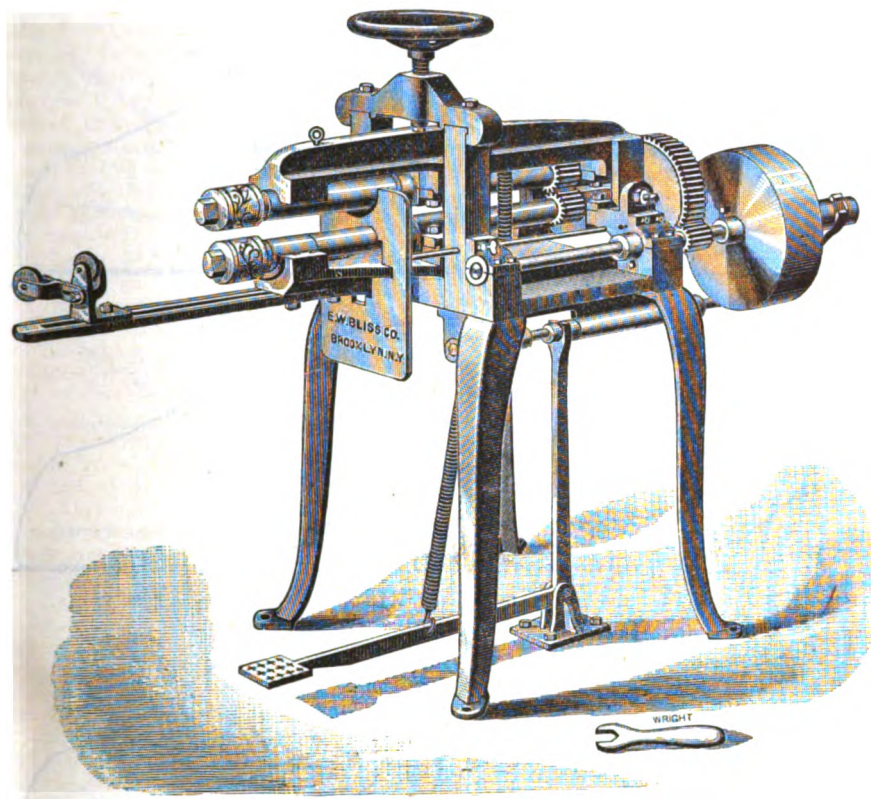
At the distance of a mile the Chief Constructor remarks that the 30 inches of side exposed subtends an angle of only 2 feet, and the turret an angle of but $\frac{1}{2}^{\circ}$. The chance of hitting this mark is, therefore, very small, and shot striking short may ricochet harmlessly over her decks. The 10-inch rifle will pierce 23 inches of wrought iron at the muzzle and 17 $\frac{1}{2}$ inches at the distance of a mile, and, as the Chief Constructor safely concludes, our present monitor may tackle the most powerful ships afloat. Their light draft and low hulls, as compared with other ships, give them a tremendous advantage, since they can lie in shoal water along our coasts, in the Chesapeake and Delaware Bays, and off our big cities, where the deep draft of ships of an enemy cannot follow, and thus keep up a destructive and harassing fire. Great speed is therefore not so vitally necessary with such a coast defender, since its light draft would enable it to choose its distance in most cases. An enemy would be compelled to send against us large, sea-going ships of high freeboard and great coal-carrying capacity, to enable them to sustain themselves for any length of time on our coast, and these ships, drawing much more water and offering a large target to shoot at, would be at a great disadvantage in fighting a monitor.

For the defense of New York no type would be more efficient. The shoals off Sandy Hook, along the Long Island shore and between the main ship channels would afford safe cruising ground for our light-draft sentinels, while torpedoes could be planted as thick as desired in the path the deep-draft enemy would be obliged to follow. There are no ships afloat to-day which carry such powerful guns with the light draft of the monitor. The Devastation, Thunderer and Dreadnaught, England's seagoing monitors of high freeboard, and all the more modern and powerful ships draw from 24 to 30 feet of water, which would compel them to maneuver with care in the vicinity of shoals.

If monitors are to be built in the future purely for coast defense their coal and provision carrying capacity could be reduced to a minimum, thus saving weight which would permit much thicker armor on turrets and sides for these floating batteries assigned for duty off our principal ports. They could run in frequently for coal and provisions at rendezvous well selected in shoal water where the enemy could not follow. To sum up, the monitor is a superb type, and by giving it a single turret the armor may be increased to 40 inches if necessary (which will defy the 100-ton gun, which pierces about 36 inches), and this with an armored turtle back but 2 feet out of water would make it practically invulnerable and a match for anything that floats.

In the City Court of Birmingham, Bammill & Co. filed a suit against H. F. De Bardeleben for \$20,000 damages. The bill of complaint alleges that the plaintiffs were residents of Belmont County, Ohio, and the owners of a boiler factory. Mr. De Bardeleben induced them to remove their plant to Bessemer, and, as the bill alleges, agreed to give them a deed to one acre of land in the Marvel City. This occurred in May, 1887, and the deed to the one acre of land has never been made, hence the suit.

The length of pipe laid in Paris for the distribution of power by compressed air already exceeds 30 miles. The compressing engines are of 3000 horse-power, and about 3,000,000 cubic feet of air are compressed daily to a pressure of 80 pounds per square inch at an expenditure of 50 tons of coal.



NEW BEADING MACHINE, BUILT BY THE E. W. BLISS COMPANY, BROOKLYN, N. Y.

ends of steel shafts, 2 $\frac{1}{2}$ inches diameter, 4 inches center to center, with bearings in the frame of the machine extending near to the rolls, thus giving a good support for heavy work. An adjustable apron gauge admits of beading work up to 14 inches from edge. An outer support for the work is provided with adjustable rolls for cylinders of different lengths and diameters, and may be removed entirely if desired. The two shafts are connected by steel-cut gears, and upon the outer end of lower shaft is mounted a cut gear 12 inches in diameter, driven by a 3-inch pinion upon a back shaft, which is also provided with a powerful friction clutch pulley, 14 inches diameter by 4-inch face. This clutch is connected with a treadle, which gives the operator complete control of its action. That part of the frame carrying the upper shaft is pivoted at the back end, the rolls being brought together by a screw and hand-wheel, and when released, strong spiral springs inside the frame separate them again.

A novel method of locating a leak in a water main was employed recently at Rochester, N. Y., with entire success.

past 20 years, the monitor is by no means an obsolete type to-day. On the contrary, it embodies many of the most essential features of a strong coast defender. The only respect in which it failed during the war, as shown by the official reports of all commanders, was in close range fighting against shore batteries and earthworks having a plunging fire and mounting a large number of guns. At long range the result was always different, and in every instance of fighting against other types of ships the monitor was uniformly victorious. Now, as the duty to which we will assign the monitor in the future will be mostly that of coast defense (fighting an attacking squadron), the one weakness developed in the past will not militate against it. The monitors were seldom pierced or permanently disabled during the war, though frequently subjected to a terrible hail of heavy projectiles. To be sure, there has been a great increase in the penetrating power of modern rifles since the war, but there has also been great improvement in methods of defensive construction, and, with thicker armor on the turrets and sides, double bottoms, and numerous water-tight compartments, our

Economy of Naphtha Engines.

As promised in a recent issue we present this week some particulars of tests of a naphtha launch engine, made a short time ago by Messrs. Paul A. Doty and Richard Beyer, at Stevens Institute, and recorded by them in their graduating thesis.

The engine upon which the experiments were made was furnished by the Gas Engine and Power Company, of New York, and was of the type illustrated and described in detail in *The Iron Age* of June 30, 1887, to which it may be interesting to refer. The engine was set up in a temporary building in the immediate vicinity of the institute building and tested several weeks. The pump which forces the liquid naphtha into the boiler is permitted to leak slightly, the liquid which escapes passing by the driving shaft, thus lubricating the bearings, and finally escaping with the exhaust vapor. As the latter is condensed and returned to the storage tank this leakage results in no loss of liquid, the only effect being the necessity of making the bore of the pump slightly larger than would be necessary if there were no leakage. But in order to test the engine it was necessary either to measure the amount of leakage or to prevent it entirely. As the latter could be more easily done the pump was changed accordingly. The dimensions of the engine are given below:

Principal dimensions of Engine and Boiler
 Number of single-acting cylinders.....3
 Diameter of cylinders, each.....3½ inches
 Stroke of piston.....4½ inches
 Piston displacement.....37¼ cubic inches
 Area of admission port.....7.32 x 2 1-16 inches
 Area of exhaust port.....5-16 x 2 1-16 inches
 Inside diameter of naphtha pump.....1¼ inches
 Stroke of naphtha pump.....1½ inches
 Travel of main valves, each.....¾ inch
 Clearance in admission port.....0.366577 cubic in.
 Clearance in indicator-pipe.....0.981750 cubic in.
 Clearance in cylinder.....0.518487 cubic in.
 Total clearance for each cylinder, 1.866814 cubic inches, or 5¼ per cent. of piston displacement.
 Floor space occupied by engine..24 x 18 inches
 Total height including stack.....6 feet
 Boiler dimensions in spiral coil:
 Height of coil.....12 inches
 Diameter of coil.....12 inches

There are seven spirals, each of four coils; inner diameter of smallest coil, 4 inches; coils are of seamless copper tubing, outside diameter of which is ½ inch. The coil is connected at its lower end to a tube leading to the naphtha pump, and at its upper end to a casting, which joins the coil to a stand-pipe. The stand-pipe is of iron, 1½ inches inside diameter, 2 feet long. The burner has 26 openings, each ⅜ inch in diameter.

Six indicator cards were taken from each cylinder with a 40 spring at as nearly uniform pressure as was practicable. It will be observed that in the first and second cylinders there is considerable initial expansion, while in the third the initial pressure is maintained with marked uniformity up to the point of cut-off, which was at half stroke. In all of them the drop at release is very abrupt, the pressure falling at once to very nearly that of the atmosphere. The back-pressure is uniform and small, and the compression line is good. The difference between the cards in the first and second engine and the third one appeared to be due to the working of the valve, although there was not time to examine into the cause.

Results.

The total horse-power developed from the three cylinders was:

	Horse-power.
First cylinder	0.9178
Second cylinder	0.9176
Third cylinder	0.9710

Total.....2.8064

The amount of naphtha burned in one hour was 9.89 pounds, and the amount of naphtha per horse-power per hour, 3.53 pounds. The market price of naphtha, June

5th, 1888, the date of the test, being 10 cents per gallon, the cost per horse-power per hour was 6.20 cents. The average number of revolutions per minute was 280.7. The number of cubic feet of water per horse-power per hour used to condense the exhaust naphtha was 135.27. The temperature in the smoke-stack was about 600° F. It was attempted to develop a higher horse-power, but when run at a much greater speed the engines did not work properly. It was inferred that the valves ought to have more lead, or else the pump should be larger, or both these conditions should exist in order to develop the higher horse-power, but the time at the disposal of Messrs. Doty and Beyer unfortunately was too limited to enable them to investigate these points.

Three sets of experiments were made to determine the relation between the press-

point does not appear to be a fixed quantity, owing to the complex chemical composition of the naphtha. In a continuous experiment, extending for one hour, the temperature at boiling rose from 140° F. to 155° F., the mean of which is 148° F. nearly. Under these circumstances the result, 142° F., found by the formula is as good as can be expected.

To find the latent heat of evaporation the exhaust vapor was condensed under atmospheric pressure by passing it through a surface condenser kept cool by a stream of water, whose initial and final temperatures were measured. It was found that the number of pounds of water passing through the condenser per hour was 25594.25. The increase in temperature of this water was 3.9° F., and the number of pounds of naphtha passing through the condenser per hour were 421.28. From

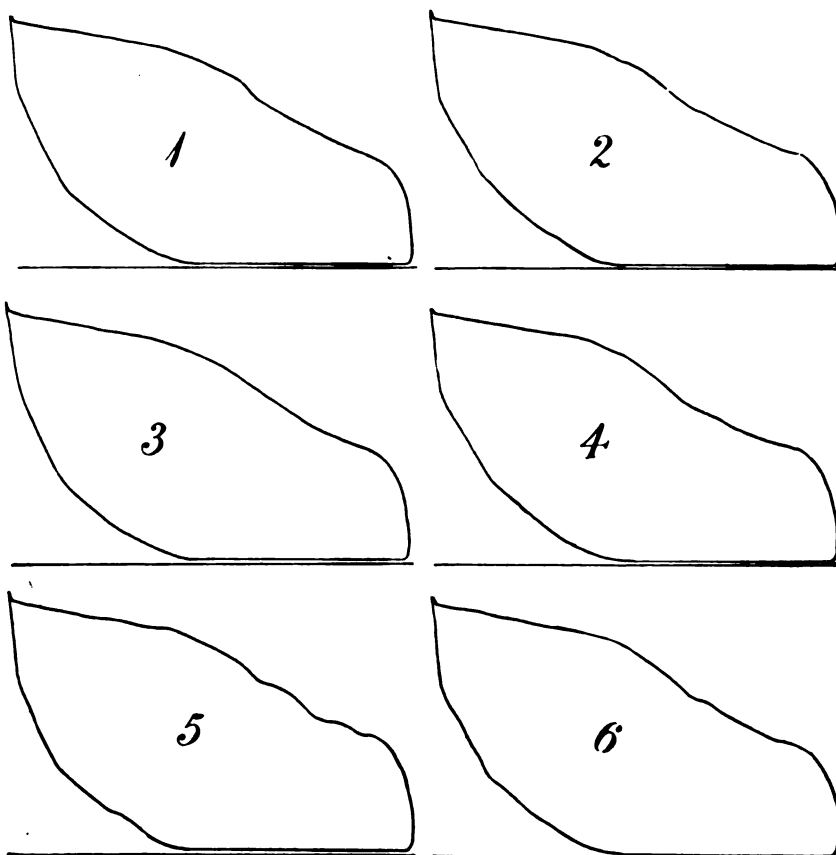


Fig. 1.—Diagrams from First Cylinder.—40 Spring.

INDICATOR CARDS FROM A NAPHTHA LAUNCH ENGINE.

ure and corresponding temperature of the saturated vapor of naphtha. These experiments gave:

At 60 lbs. pressure.....	258° F.
" 47 "	242° F.
" 35 "	235° F.

which substituted in Rankine's formula (Wood's Thermodynamics, p. 67),

$$\text{com. log. } p = A - \frac{B}{\tau} - \frac{C}{\tau^2},$$

gives, for the continuous relation between the pressure per square foot and the absolute temperature:

$$\text{com. log. } p = 6.47 - \frac{890}{\tau} - \frac{625750}{\tau^2}$$

As a partial test of the correctness of this formula Messrs. Doty and Beyer computed from it the temperature of the vapor for a pressure of one atmosphere, or $p = 2116.2$ pounds, finding $\tau = 602^\circ$ F. absolute, $T = 142^\circ$ F. above the zero of the Fahrenheit scale. An independent test was made in the laboratory to determine the boiling point directly. The boiling

this they deduce $25594.25 \times 3.9^\circ = 99817.575$ heat units; $99817.575 \div 421.28 = 236.94$ as the latent heat of evaporation at atmospheric pressure.

Volume of Vapor.

From equation (84), p. 98 of Wood's Thermodynamics, they have for the volume of 1 pound of the saturated vapor:

$$V_2 - V_1 = \frac{He}{\tau \frac{dp}{d\tau}} = \frac{He}{p \left(\frac{B}{\tau} + \frac{2C}{\tau^2} \right) \times 2.3026}$$

which for naphtha vapor becomes

$$V_2 - V_1 = \frac{236.94 \times 778}{24035.5} = 7.669 \text{ cubic feet.}$$

The volume of 1 pound of naphtha at 60° F. = 0.0284 cubic feet; therefore, $V_2 = 7.669 - 0.0284 = 7.6406$ cubic feet.

The number of pounds per cubic foot is $24085.5 \div 184339.32 = 0.1304$ pounds.

One pound of naphtha vapor at atmospheric pressure occupies $7.689 \div .0234 =$

using oil for fuel. The building is so large that an enormous stock of coal would have to be constantly carried to meet its requirements, while oil can be stored a.

flammable contents could be incurred. A cleaner and more controllable fuel than coal will also be obtained in this way, which is an important consideration in the minds of the builders of the Auditorium.

The Cruiser Charleston.

The first of the new cruisers laid down by the present Navy Department was launched last week from the Union Iron Works, San Francisco. The Charleston is a twin-screw cruiser of 3730 tons, built of steel throughout, having a length between perpendiculars of 300 feet, a beam of 46, a draft forward of $17\frac{1}{4}$ feet, and a draft aft of $19\frac{1}{4}$. She is double-bottomed under engines and boilers. She has also a curved or turtle-back steel deck from two to three inches thick running from stem to stern, and protecting everything below it, being a foot above load-water line at the crown and then sloping at its edges to four feet below the water. Coal bunkers are so arranged as to furnish further protection. The compound engines are in two separate compartments, and actuate 8-bladed twin-screws. The indicated horse-power under forced draft is 7500, and she is expected to make a maximum of fully 18 knots an hour. At 10 knots an hour her coal will last for 8600 miles, and at 8 knots for 11,000. She has no sail power, however, except storm sails, but has two military masts. Her regular coal capacity is 450 tons, but she can carry 800, with an increase then of $1\frac{1}{4}$ feet in her draft. Her hold is divided into many water-tight compartments by bulkheads, furnishing room for stores, ammunition, chains, and so on. The main battery consists of two high-power breech-loading, 10-inch steel rifles, mounted on central pivots, besides six 6-inch rifled breech-loaders. The secondary battery of the Charleston will consist of rapid-fire Hotchkiss guns and Gatlings, and she will also have a supply of automobile torpedoes, to be launched from tubes mounted above water in broadside.

The Molders' Union.—At the Iron Molders' National Convention which was held in St. Louis recently, it was reported officially that in 1886 and 1887 there had been 22 disagreements between employers and union molders over wages and hours of labor. Of these 12 cases were settled on terms favorable to the molders, 7 were defeats, 1 is still unsettled and 2 continue in active progress. The most notable defeat was suffered in the strike which began in March, 1887, at the stove works of the Bridge and Beach Mfg. Company, of St. Louis. The National Association aided the strikers for the following half year and then withdrew from the contest. It cost Union No. 10 alone the sum of \$23,348.40, and built up the Manufacturers' Defense Association in powerful opposition to the workingmen's organization. The strike fund was reported at the recent session to have received during the past year \$36,068.93, and to have disbursed \$33,833.54 among 18 unions, leaving \$2,235.39 on hand. There was a net increase of 3571 members in the year.

According to Prof. R. H. Thurston, there are three great chances left for inventors—viz., the production of electricity directly from the combustion of coal or similar fuel; secondly, the production of light without heat, as in the case of the light of the firefly and that of the glow-worm; and, thirdly, the production of a successful air ship.

The Blake and Blenheim, two of the latest English cruisers, have been designed for speeds of 22 knots per hour.

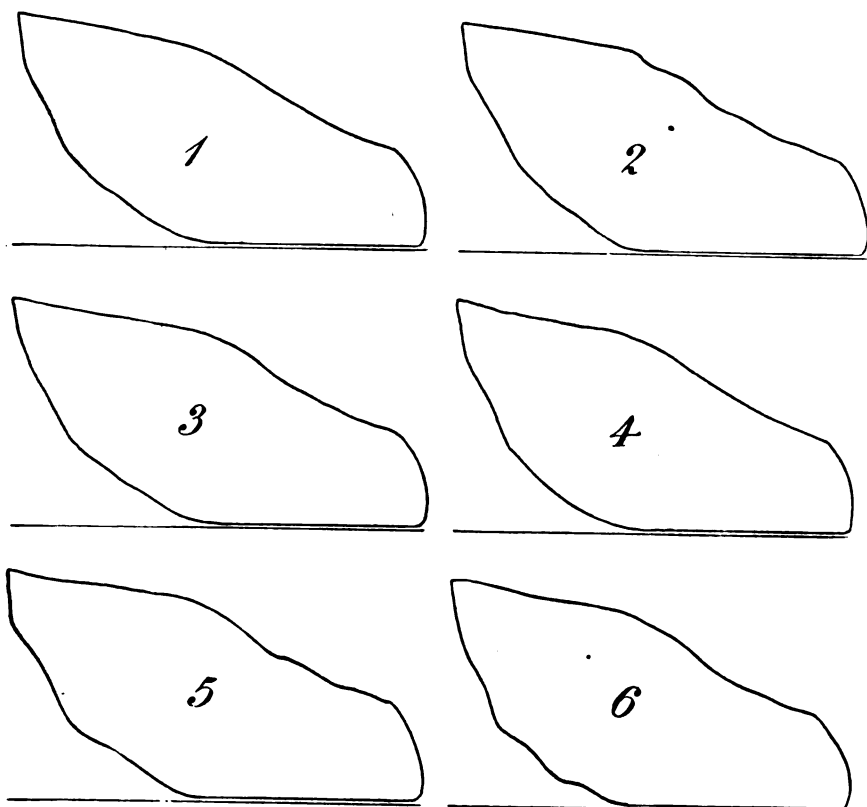


Fig. 2.—Diagrams from Second Cylinder.—40 Spring.

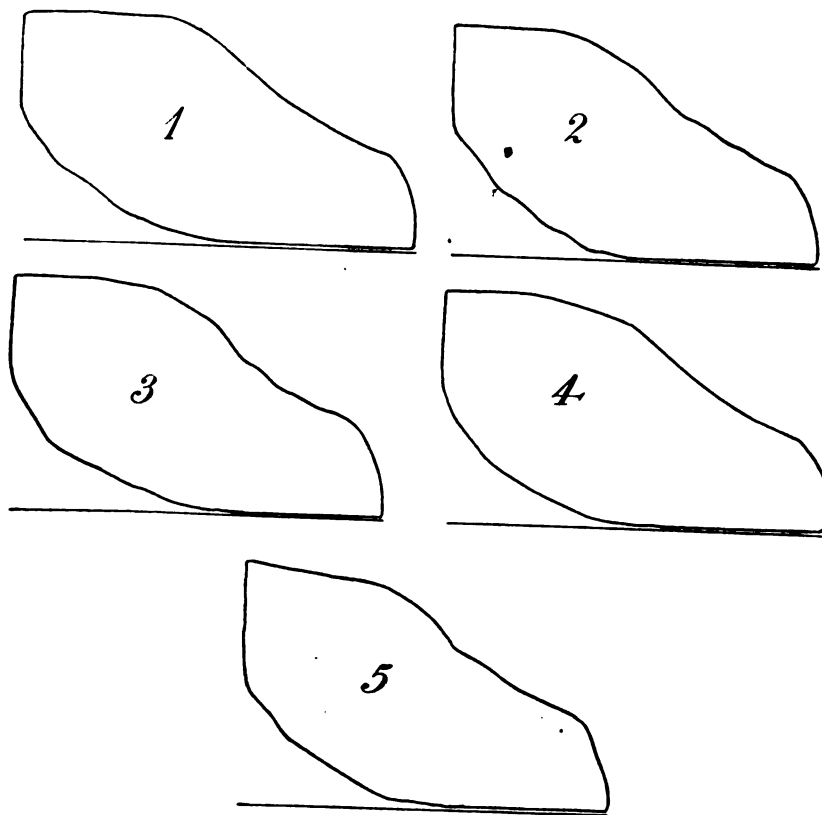


Fig. 3.—Diagrams from Third Cylinder.—40 Spring.

INDICATOR CARDS FROM A NAPHTHA LAUNCH ENGINE.

827.78 times the volume of 1 pound of naphtha at 60° F., while steam occupies about 1660 times its volume as water.

The great Auditorium building in Chicago is being fitted up with a view to

long distance from the building and piped in gradually as it is consumed. The tanks for storing the oil supply will be located on the lake front outside of the tracks of the Illinois Central Railroad, and so far away that no possible risk from their in-

Recent Customs Decisions.

DUTIES ON THIN SHEETS OF STEEL.

The Secretary of the Treasury has revoked a former decision that certain so-called "black taggers" iron was dutiable at the rates for steel in sheets, having reached the following conclusions upon the questions involved:

Schedule C (T. I., 151) provides that "all iron commercially known as common or black taggers iron, whether put up in boxes or bundles, or not," shall pay a duty of 30 per cent. ad valorem. This paragraph also expressly includes various kinds of plate and sheet iron, and closes with a proviso "that on all such iron and steel sheets or plates aforesaid, excepting, &c., when galvanized or coated with zinc or spelter or other metals, or any alloy of those metals, $\frac{1}{2}$ cent per pound additional."

"Taggers iron" was first mentioned *eo nomine* in the act of August 30, 1842, but does not seem to have been specially designated in subsequent tariff laws until the passage of the act of June 30, 1864, but during the period intervening between 1846 and 1864 was probably classified for duty under the provision in the various tariff laws for sheet iron, common or black, &c. Since 1864 it has paid duty at the rate of 30 per cent. ad valorem, it being specially enumerated.

The proofs show that during all this period, and down to the passage of this act of March 3, 1883, merchandise having substantially the same qualities, and produced by the same process of manufacture as the articles described in these importations, was commercially known as "taggers iron," or "black taggers," and was classified for duty under the provisions of law above referred to. Such classification continued after the passage of the act of 1883, until in January last, when it was insisted by the revenue officers that this merchandise was not iron or a manufacture of iron, but was steel or a manufacture of steel, and should be classified under paragraph 177, which imposes a duty upon steel bands, hoops, and sheets of all gauges and widths valued at 4 cents a pound or less, at the rate of 45 per cent. ad valorem, and if cold-rolled, &c., $\frac{1}{2}$ cent per pound in addition, and duty was levied accordingly; and it was in one of these cases that the decision of the Department was made.

It will be perceived from an examination of this decision that among other things it was based upon a report from the appraiser at New York stating "that brands identical with those covered by the entries in question have been invariably classified at that port as steel," &c. This proves to be an incorrect statement of the contents of the report in this respect, as the report merely stated that it was the practice at that port to classify such merchandise as steel, but that it had been invariably so classified at that port was an inference of the Department, and not a fact stated by the appraiser. A further report from the appraiser at New York was called for in these cases, from which it appears that for a period of 20 years or more it has been the invariable practice at that port to classify such merchandise as "taggers iron," and to assess duty accordingly. The same fact is also conclusively established by the papers submitted by the appellants, and the further fact that during all this period it was commercially known as "taggers iron," and bought and sold in the market as such.

Affidavits of the manufacturers are also submitted, from which it is, I think, satisfactorily made to appear that the article is in fact iron or a manufacture of that material, and not steel or a manufacture of steel. The only evidence tending to show that it is a manufacture of steel is

the report of the chemists who have made the analyses or tests of the metal, which is to the effect that it is a low grade of steel. Whatever the fact may be in this respect, I cannot doubt, from an examination of paragraph 151 and subsequent paragraphs, that it was the intention of Congress to subject it to duty according to its well-known commercial designation. Such seems to be the express language of paragraph 151, and the proviso also contemplates that some of the articles specified in the paragraph might also possess the properties of steel, for it declares "that on all such iron and steel sheets or plates aforesaid" an additional duty might in certain cases be imposed. So in paragraph 153 "iron or steel sheets or plates, or taggers iron," seemed to be regarded as convertible terms. The said decision, having been made upon an erroneous view of the facts in the case, is hereby revoked, and the claim of the appellants, which is that the merchandise is dutiable at the rate of 30 per cent. ad valorem, under the provisions in said schedule for "all iron commercially known as common or black taggers iron, whether put up in boxes or bundles, or not," is hereby sustained. The collector is instructed to reliquidate the entry accordingly, and to take the necessary steps for the repayment of the duties erroneously exacted.

DUTY ON POLISHED PLATE ZINC.

On an appeal from an assessment of duty at the rate of 45 per cent. on "zinc or tutenag in sheets nickel-plated," claiming that the merchandise is dutiable at 2 $\frac{1}{2}$ cents per pound, as zinc or tutenag in sheets, or at no more than 35 per cent. ad valorem, as plated articles, and returned by the appraiser as a manufacture of zinc, the Secretary of the Treasury says: "From the special report of the appraiser it appears that the merchandise in question consists of sheets of zinc not nickel-plated, which are specially manufactured for printing purposes, and are stamped 'polished plate for transfer or pen work,' that these sheets are cut in the forms and of the sizes to suit the special purposes for which they are designed, and that they are not the 'sheet zinc' of commerce. It also appears that these sheets have the surface of one side deadened by the apparent use of an acid, while the surface of the opposite side has been highly polished by friction. These articles are, therefore, manufactures, and, being of zinc and not otherwise specially enumerated or provided for, are dutiable at the rate assessed."

Among the papers just published by the American Institute of Mining Engineers, is one by Frank C. Roberts, of Philadelphia, on calculations of the available heat and the required dimensions of chimneys, combustion-chambers and gas burners in the use of blast-furnace gases for firing boilers.

Judge Wheeler, in the United States Circuit Court, has rendered a decision in favor of the city in the important suit of Campbell vs. the Mayor, &c., of New York. The claim was for the infringement of the patent of James Knibbs for a relief valve for steam fire-engines granted in May, 1864, and the amount involved was upward of \$2,500,000. The suit was commenced in 1877. Testimony was taken for four years, and the suit was first heard in 1881 by Judge Wheeler, who held the patent valid and infringed by the city fire-engines, and decided in favor of the complainant. A reference was then ordered to a master to compute the amount due from the city, and this reference has been continued for some years to the present time. The Court has now reversed its former decision, and holds that the patent is invalid, be-

cause the invention is proved to have been in public use for more than two years prior to the application.

Employers' Liability in Massachusetts.

Western Massachusetts, if not the entire State, has had for the past week the trial of the first cause under what is known as the Employers' Liability act, passed in 1877, in four cases tried together against the Hudson Iron Company. October 15 last Patrick Myers, Michael Flynn, Michael Kane and John Fallon, all employees of the Hudson Iron Company, while being lowered into the mine in the morning in a bucket commonly used for that purpose, and also for hoisting ore, received injuries which rendered one of the plaintiffs crippled for life, and the others were also badly injured. By some means the hoisting machinery was out of order, and when 50 feet from the top of the shaft it gave way and the four men fell a distance of 125 feet in the bucket to the bottom of the shaft. Myers brought suit for \$10,000 and the other three for \$5000 each against the Hudson Iron Company, a wealthy corporation, whose furnaces are at Hudson, N. Y., but whose mines are at West Stockbridge, just over the line in Massachusetts. The case was begun before Chief Justice Brigham, of the Superior Court, last week, and was concluded in a disagreement of the jury.

The plaintiffs claimed that under the new Employers' Liability act defendants were guilty of gross carelessness in not providing proper machinery; that it was old and had been frequently broken, and that the brake bar regulating the speed of the bucket going down into the mine had become so weakened that it could not hold a load of four men; that the horns of the friction-clutch operating drum had become beveled, and when they were applied to the rapidly descending bucket did not hold; also that the company did not employ a competent engineer at that time to manipulate the machine; that oil and water had been allowed to accumulate on the drum-head so that the brake would not hold. On the other hand the defendants set up that the men could go either by bucket or a chute in another part of the mine, and that going by bucket was their option, and that they did not exercise due care, and thereby contributed to negligence. Scores of witnesses, many of them expert machinists, were examined, and it appeared in evidence that shovelers, like the plaintiffs, were allowed no discretion, but had to go by the bucket, while the miners went by chutes.

The case has attracted a good deal of attention, especially as the Knights of Labor have furnished money for the prosecution of the company as a test case, while, on the other hand, many manufacturers and others have attended court in order to see what decision would be reached, as it might affect their own mills. Chief-Justice Brigham held that if the defendants had furnished an ordinarily safe machine that they had discharged their duty, especially if the plaintiffs had the option to go by the bucket rather than the chute. The jury deliberated nine hours and stood nine for a verdict and three against. The latter held that there was an option afforded plaintiffs to get to the mine, and that from a personal view of the premises by the jury when the trial began the machine that was capable of raising and lowering 700 pounds of ore was capable of carrying safely four ordinary sized men. Senator Dawes was of counsel for defense. Additional interest now attaches to the case from the fact that no decision has been reached, and that there will now be a delay of new trial before the question can be decided.

THE WEEK.

The directory "booms" of many prosperous and ambitious American cities are under full headway now. The little city of Portland, Ore., shows an increase of 1650 names over last year's directory and ten larger cities make the following gains in the number of names: Milwaukee, 5286; Atlanta, 5809; Denver, 5866; Kansas City, 6373; St. Louis, 6984; Omaha, 8135; Brooklyn, 8256; Baltimore, 9488; Minneapolis, 15,069, and Chicago, 16,675. The most remarkable figures are those from Baltimore and Minneapolis. There will be at least 30 cities in the United States in 1890, instead of 20, as in 1880, which will show a population of more than 100,000, and the number may reach 35.

The River and Harbor Bill, appropriating over \$22,000,000, the largest amount ever voted by Congress in that direction, now awaits the President's signature. The Conference Committee struck out the item of \$500,000 for the purchase of the Portage Lake Canal, Mich., but the items providing for surveys of the Hennepin Canal and the proposed canal between the Illinois River and Lake Michigan are retained on the condition that the Government be not considered committed to either of the schemes.

The sugar trade is badly demoralized by Trust operations and the corner of the raw product produced by their chief antagonist, Claus Spreckles. The whole sale grocers suddenly found their supplies seriously reduced, and the Trust was unprepared to meet the emergency both as to supply of raw material and refining capacity. Not only are refineries from one to two weeks behind in their deliveries, but for the most part they have declined to take orders except to book them at prices to be fixed for them on delivery. As a consequence the jobber has been forced to sell sugar at such a close margin of profit that there scarcely rests any motive for doing business. The jobbers gross profit on assorted grades is about 7 per cent. It costs him 6 per cent. to handle the goods, leaving him 1 per cent. net.

The total exports of petroleum and other mineral oils from the United States for the fiscal year ending June 30, 1888, amounted to 554,901,395 gallons, valued at \$45,150,708, compared with 576,094,849 gallons, valued at \$45,423,474, for the previous year. This is a decrease of 21,193,454 in gallons and \$272,766 in value. The following ports, which ship about 99 per cent. of the total exports, shipped amounts during the past two years as follows:

	1888. Gallons.	1887. Gallons.
New York.....	394,180,131	400,488,533
Philadelphia.....	146,671,617	156,519,944
Baltimore.....	8,684,648	12,428,145
Boston.....	5,364,999	6,658,227
Total.....	554,901,395	576,094,849

Of the \$8,000,000 invested in the pottery industry in this country \$4,000,000 is centered in Trenton, N. J. There are 26 potteries there. They give employment to about 5000 persons, who receive weekly in wages about \$50,000 when the potteries are running. A fine earthenware dinner set, decorated with flowers, gold edge, and so forth, can be purchased now from the American potteries for \$25. The same thing would have cost from an English pottery before 1878 \$45.

The subject of Australian trade is receiving special attention on the Pacific Coast on account of the Melbourne International Exhibition, as the Californians are anxious to secure the largest share pos-

sible. A San Francisco paper, looking at the statistics of the trade with the United States during the last two years, says: They show that our imports from the colonies increased to the extent of \$1,500,000 within a year, while our exports to the colonies decreased to about the same extent. The figures are as follows, and are for the fiscal year ending June 30:

Year.	Imports.	Exports.
1886.....	\$3,859,360	\$11,134,301
1887.....	4,411,119	9,668,435

This shows a considerable loss in our export trade, which is pretty evenly divided in proportion to its extent between Pacific Coast and Eastern points, thus:

	Exports. 1886.	1887.
Pacific Coast.....	\$2,150,046	\$1,731,675
Eastern points.....	8,984,255	7,936,760
Total.....	\$11,134,301	\$9,668,435

In the matter of imports, however, the Pacific Coast shows an increase of \$814,000 in the course of a year, while in the East the imports decreased to the extent of \$262,000 in the same year.

Dr. H. N. Allen, secretary of the Korean Legation to the United States, speaks of the growing intimacy between the two countries, whose relations are closer than those with any other. He is now in New York arranging direct telegraphic communication. California will probably be granted concessions to work the gold mines, which are believed to be very rich. American officers are reorganizing the Korean army and will introduce American weapons. A contract has been made with a firm in the United States for the exportation of 50,000 tons of rice.

Oscar S. Straus, United States Minister to Constantinople, who is about to return on a temporary leave of absence, reports that the relations existing between the two countries are of the most friendly character.

Wealthy Chinamen are obtaining subscriptions for a Chinese Exchange to be erected in Mott street, New York City, to be the headquarters for all Chinamen east of the Rocky Mountains.

There is now on the stocks at Waldoboro, Me., one of the most remarkable vessels ever built in the United States—a five-masted center-board schooner, which will be the largest vessel of its kind afloat. Her length of keel is 225 feet, her breadth is 50 feet, depth of hold, 21 feet, and her measurement will be 1800 tons. Her masts will be of Oregon pine, and her foremast, mainmast, mizzenmast, spankermast and jigger will be each 115 feet in length. There will be used in her construction 450 tons of white oak from Virginia, 800,000 feet of hard pine from Georgia, and 175 to 200 tons of iron. Her outboard planking will be 6 inches thick from keel to top, and her inside ceiling will be from 10 to 14 inches in thickness. She will have two full decks running the entire length of the vessel and nine hatches. She will be launched in October. She will be employed in the coal trade.

The work of regilding the copper dome of the State House, in Boston, has been commenced and will be completed in six weeks. It was originally gilded about 14 years ago. The dome is 35 feet high and 53 feet in diameter. The whole is enclosed in a cage of lumber, to serve as a framework for a canvas covering, for the protection of the gilders. The copper surface will be polished to the smoothness of glass, and then given a coating of size, over which will be a layer of yellow paint. The sizing will be composed of the best varnish, turpentine and the oldest pure linseed oil, and when this has partially set the surface is ready for the gilders. Two

hundred and forty packs of 23-carat gold-leaf will be required. Each book is worth \$4.70.

Col. Longendycke has been in the cattle business in Kansas and the Southwest for many years, and he believes that the days of the ranchmen in this country are numbered. He further believes that South America offers a fine field for the cattle industry, and that from the grassy plains of Brazil and the Argentine Republic must come the cheap beef of the future. With that in view he has formed an association who propose to secure a large tract of grazing lands in the Amazon Valley and export beef from Brazil for consumption in the United States.

One of the principal iron steamship builders in Philadelphia has in course of construction nine steamships, including those contracted for by the Government.

The Senate confirmed the nomination of Melville W. Fuller to be Chief Justice of the United States Supreme Court, by a vote of 41 to 20.

The population of California at the present time is officially stated to be over 1,500,000, almost doubling that of 1880.

Nearly 1000 houses in Port-au-Prince were destroyed by an incendiary fire which broke out in the Senate Building, July 4. On account of fears of a rebellion of the political factions valuable merchandise has been placed in fire-proof buildings so far as practicable. The best part of the city is in ashes.

The population of Washington city is 218,000, including 72,500 colored.

Orange culture in Louisiana is making good progress. A single parish this year will yield oranges to the value of \$170,000, or almost as much as the entire State eight years ago.

An appalling cloud-burst last Thursday in Western Virginia swept bare 100 square miles of agricultural country and at Wheeling several lives were lost. Nine railroad bridges and 25 wagon bridges are gone in Ohio County alone, and a low estimate puts the loss \$350,000. In Belmont County, Ohio, the loss will aggregate \$100,000.

The Pithole farm in the Pennsylvania oil regions once sold for \$1,500,000, but for 20 years has produced nothing. A few days ago, however, wells there began to yield 150 barrels a day and once more territory lately regarded as worthless is in demand.

The Cuban sugar crop promises a large yield.

The Industrial Home and School of St. Francis de Sales, near Bristol, Pa., founded by the daughters of the late Francis A. Drexel, was opened last week with 200 boys. The value of the property is \$200,000, and the generous founders have provided for the current expenses of the institution. Manual training will be its great feature.

Representatives of three-fourths of all the nut and bolt manufactories in the United States met at the Fifth Avenue Hotel last week and arranged the preliminaries for an association of all the manufacturers in this country to maintain prices and prevent disastrous competition and overproduction. Eighteen persons were present, representing over 30 of the 45 factories now in operation. It was determined that an organization of the character proposed should be effected if a sufficient number of those not represented in the meeting would co-operate to give the association the necessary strength. A committee was appointed to draft the form of an agreement for the signature of the members at the next meeting. By the agreement

special discounts are to be given to dealers handling exclusively the goods of the association factories, and all the members of the association bind themselves by strict penalties not to sell their goods below the association schedule. The product of the nut and bolt manufactories of the United States amounts annually to several million dollars. It has of late years increased beyond the legitimate demands of the trade. Competition in price has naturally diminished the profits of the contending manufacturers, hence this organization.

The contract labor law is practically a nullity. So far as it has any efficacy skilled labor is excluded, while the padrone and his counterparts of various nationalities meet with little impediment. The immigrant who comes with some definite knowledge of what he is to do to earn a living, and with some assurance of employment, is the most welcome, certainly, and yet it is against him that this law necessarily operates. Chairman Melbourne H. Ford of the Congressional Committee to investigate the violation of the laws bearing on immigration is taking testimony, and will in all probability occupy two or three weeks at the least in this city.

The Connellsville coke operators have shipped 8000 tons of coke to Newfound-land and expect to show that it is superior to the English product.

The Board of Water Commissioners of the village of Sing Sing awarded the following contracts for the construction of the new waterworks there: Gloucester Iron Company, Philadelphia, pipe and special castings, \$38,261; R. D. Wood & Co., Philadelphia, hydrants and valves, \$4244, and other contracts for reservoirs, &c., amounting to \$113,344. The sum of \$150,000 has been appropriated, and the contract for the pump, engine and boiler is yet to be given out.

Five ships are on their way to Tacoma, W. T., from Japan, with 12,000,000 pounds of tea, to be shipped East over the Northern Pacific Railroad. The first of the fleet has already arrived and the American company doubtless feels that it has scored a good point against the Canadian Pacific.

Traffic on the Erie Canal is the lightest experienced in July for three years. The loss is principally in the transportation of grain and lumber. Freight rates, too, are extremely low, while last year vessels were profitably employed the entire season.

The State Forest Commission last week summarily disposed of the 200 "custodians" that it received as a legacy from the Land Commission when the Forest Commissioners were appointed about two years ago. At the meeting of the board in this city, President Sherman W. Knerals presiding, the decision was to the effect that these custodians had never been legally appointed, and all their supposed rights were revoked. Unless the custodians contest their removal in the courts, some 200 cottages and villas in the Adirondack and Catskill Mountains will revert to the State, and their owners will have to find other sequestered nooks upon land not belonging to all the people in general and no one in particular.

The machinery of the great silk mill of the Phoenix Mfg. Company, in Pottsville, Pa., was started last week. The mill has been one year in construction, and is said to be the most extensive and completely equipped establishment of the kind in the country.

Naval officials are very much pleased over the successful casting of the stern post of the cruiser Charleston at the Pacific Rolling Mills, which is shown to have been an exceptionally fine, extra

smooth, sound casting of open-hearth steel. The weight of the charge placed in the furnace was 27,295 pounds of metal, and the dressed casting weighed 11,510 pounds. Test pieces taken from this casting gave an elastic limit of 33,742 pounds per square inch, a tensile strength of 63,112 pounds per square inch, 18 per cent. elongation in 8 inches and 20 per cent. reduction of area. Bending test pieces were bent cold over radii varying from $\frac{1}{4}$ inch to $1\frac{1}{4}$ inches through angles varying from 218° to 234° without fracture.

A statement, prepared at the Patent office, shows that during the six months ended June 30, there were 18,685 applications for patents and 1298 caveats filled. During the same time 10,855 patents and reissues were granted. The receipts of the office were \$568,091. In each of these items there is an increase over the same months of last year.

The Erie Railroad have adopted the same system as that in use by the Pennsylvania at their Jersey City terminus for protection against fire. They have 28 boxes in all, located at important points and covering all places controlled by them. A land force and fire-tug force have been established, with full instructions how to act in case of fire, each force having a chief and assistant chief.

The Detroit city hall was badly wrecked a few days ago by an explosion, which investigation proves to have been caused by a leakage of gas.

The report of the Secretary of the Prison Reform Association shows that the proportion of prisoners to the total population of the country has increased rapidly. In 1850 the census showed a percentage of 0.29, but in 1860 of 0.607. The percentage of foreign-born prisoners as compared with that of natives is now a little less than double. In 1850 it was more than five times that of native prisoners. In other words, the increase of crime has been greater among the native population than the foreign. Foreign disregard for law shows itself far more in immorality and disorder than it does in dishonesty or violence.

The Russian Consul at Nagasaki calls attention to the excellent opportunities for the introduction of Russian oil into Japan. He asserts that Russian kerosene is both cheaper and better than the American, and ascribes it to the want of enterprise of Russian merchants that this important article has not been widely spread all through Japan.

Another steel bridge will be built across the Allegheny River in Pittsburgh, for the electric lines of cars. The capital to be invested is \$500,000.

The Eclipse Mfg. Company.

The new works occupied by the Eclipse Mfg. Company in the manufacture of steam and hot-water radiators are located in the southwestern part of Chicago, on Twenty-second street, near Western avenue. These works were built by the company with a special view to their purposes, and form a very compact and well-arranged plant. One building, 60 x 256 feet, built of brick, shelters the whole working force. The front, to a depth of 130 feet, is occupied by the machine shop, with a portion at one side partitioned off for a shipping room and a small space in a corner on the other side for an office. In the rear of the machine shop is a room for cleaning castings, which extends the full width of the building. The foundry, 60 x 125 feet, occupies the remaining space and is open to the roof. The machine shop has a basement under it and the pattern shop

overhead in a second story. The building is constructed of brick and is supplied with numerous windows, the foundry being particularly well lighted from the sides and from windows in the ventilator, which extends along the comb of the roof.

As the output of the foundry consists of radiator loops and other hollow castings, an unusual number of core-makers is employed for the quantity of work performed. Over one-fourth of the 45 hands employed in this department are core-makers. The capacity of the foundry is now 400 to 500 radiator loops per day, with one 10-ton cupola. The metal is tapped from the cupola directly into casting ladles, which are carried at once to the flasks, in order to keep it as hot and liquid as possible. The melting of metal and heating of cores are done exclusively with coke.

The machine shop is equipped with lathes and with special tools for finishing and connecting the loops. After the loops are cast and cleaned the first process is to test them with water to see that they are free from holes. They are then taken to a machine and tapped. A special machine faces the upper ends of the hot-water loops, another dresses the ends to go together, another cuts the nipples, &c. A very interesting machine is used to screw the loops together, which it does more perfectly and economically than could be done by any hand process. These special machines were all built by the company except a very few, which were built elsewhere for lack of time. After the loops have been joined they are tested with water-pressure at 65 pounds to the square inch, and with steam from the boiler furnishing power to the engine, which ranges from 60 to 70 pounds. The radiators are shipped in the rough to their destination, the painting and decorating being done to best advantage after they are set in position to be used. In the machine shop and other departments outside of the foundry about 50 men are regularly employed.

The products of the company, in addition to steam and hot-water radiators, are steam traps, back-pressure valves, purifying valves for purifying water going into boilers, rocking-grate bars, and pressure regulators or reducing valves. The Eclipse back-pressure valve is an automatic device placed on the exhaust-pipe of a steam engine, so that the exhaust steam, which would otherwise be wasted, may be utilized for heating the building, &c., and the valve is so constructed that any surplus quantity of exhaust steam passes off through it into the atmosphere without noise and without the rapid wear usual to such devices. The Eclipse pressure regulator is adapted for use in heating apparatus or manufacturing when a constant, unvarying pressure below 10 pounds is required, notwithstanding the variations above this pressure that may take place in the boiler. New and improved forms of radiators are also being made by the company, embodying ornamental designs and securing greater efficiency.

The location of the works is excellent for gathering together materials, shipping goods, and expanding when greater facilities are required. A siding runs into the yard from the Chicago, Burlington and Quincy Railroad. A number of adjoining vacant lots are owned by the company, and additional buildings are contemplated, as orders are at present in excess of their capacity. A second cupola has already been decided upon, as ample room was left for it in the construction of the foundry. Gas for illuminating purposes is manufactured on the ground from gasoline, which is found to be economical and wholly satisfactory in every respect. The city office of the company is located in the Rookery Building, room 418, in which specimens of their products are exhibited.

MANUFACTURING.

Iron and Steel.

We are informed that the report that the Standard Iron Company, of Bridgeport, Ohio, whose works have been idle for some time, would sign the scale and resume operations on the 23d inst., is without foundation. The company have not as yet decided when they will resume operations again.

The Reeves Iron Company, of Canal Dover, Ohio, are constructing a regenerative gas furnace, with the necessary gas producers, from plans furnished by Alex. Laughlin & Co., engineers, of Cleveland, Ohio, and upon its completion intend erecting another furnace immediately, for their 8-inch mill.

The plant of the Warren Tube Company, at Warren, Ohio, is advertised to be sold by the Sheriff on the 14th of August next. The appraised value of the plant is \$115,000.

The Sharon Iron Company, of Sharon, Pa., signed the Amalgamated scale last week and their plant has resumed operations in all departments.

Negotiations are pending with persons who desire to lease the new charcoal furnace of the Decatur Land, Improvement and Furnace Company, at Decatur, Ala., which is now nearly finished.

J. W. Walker, proprietor of the Shiffler Bridge Works, at Pittsburgh, Pa., reports a large amount of business on hand at present. In the matter of mill buildings and steel plants, he is now engaged on a contract with H. Disston & Sons, the well-known saw manufacturers, of Philadelphia, to replace the buildings of that firm recently burned, which cover over 60,000 square feet of ground. He is also erecting, for the Allegheny Bessemer Steel Company, at Duquesne, Pa., a main building constructed entirely of wrought iron and covering about 40,000 square feet, and an iron building to be used as a cast-house for the Attala Furnace Company, of Attala, and several other smaller structures. In addition to these Mr. Walker has a large amount of bridge work for various railroads throughout the country, among which may be named Baltimore and Ohio, Pennsylvania Railroad and Pennsylvania Company's lines West of Pittsburgh, East Tennessee, Virginia and Georgia, Kanawha and Ohio, Chattanooga, Rome and Columbus, Oxford and Clarksville railroads.

A special dispatch from Warren, Ohio, under date of the 20th inst., reads as follows: "In 1883, when James Ward failed in the iron business at Niles, he owed his men \$15,000, and it was not thought possible that more than 50 per cent. of this could ever be paid. John M. Stull, of this city, was made assignee, and, by judicious handling of the property, he has been able to pay the debt in full, the men receiving the last dollar due them to-day."

The Catocin coke furnace was expected to be blown in about July 28. The property will be under the control of Thomas Gorsuch, as agent, until the new company are organized and a charter obtained.

The Bellaire Nail Works, of Bellaire, Ohio, are making some extensive additions to their plant. The steel department will be almost reconstructed throughout, and will not be ready to resume operations for several weeks yet. Among other improvements two new switches are being laid, making eight in all, which will be covered by a building 810 x 150 feet, covering over 1 acre under roof, and accommodating 32 cars at once. The necessity for this extensive dumping ground will be realized

when it is known that 18 cars of ore and 16 cars of coke are unloaded at the works every day. The blast furnace of this company is still doing remarkable work. For the six months ending on June 30 its output was 26,540 tons.

Charles Huston & Sons, proprietors of the Lukens Rolling Mills, at Coatesville, Pa., have just put in a new set of three-high rolls, 98 x 30, in place of 84 x 25, as heretofore. They also put a new cylinder of increased size, with Corliss valve-gear, to their engine, which was formerly of the slide-valve pattern. All the work is now complete and running satisfactorily. Orders are reported plenty.

Col. James Collord, of Collord & McKee, pig-iron brokers, of Pittsburgh, and John J. Spearman, of Sharon, Pa., have leased the Sharon furnace of Boyce, Rawle & Co. at that place, and will put it in first-class repair, with the intention of early resumption. They have an option on the purchase of the plant at a reasonable figure. The furnace has been idle nearly a year.

The rail-mill department of the Cleveland Rolling Mill Company, of Cleveland, Ohio, is running double time at present.

The rolling mills of the Oxford Iron Company, at Belvidere, N. J., resumed operations on Thursday. Harmony exists between employers and employees. The works have been closed for several weeks.

D. W. C. Carroll & Co., Limited, of the Fort Pitt Boiler Works, Pittsburgh, have just received an order for four 35,000-barrel oil tanks, six 600-barrel oil stills and three large tubular steel boilers, complete, all to be completed in 120 days.

The two Cedar Point furnaces of the Baltimore Iron Company, at Baltimore, Md., have been dismantled. The wharf property has been sold to the Philadelphia, Wilmington and Baltimore Railroad Company.

P. L. Kimberly & Co., Limited, of Sharon, Pa., signed the Amalgamated scale for the Atlantic Iron and Nail Works, at that place, and these works resumed operations in full in all but the nail department on Monday, the 23d inst. The plant has been idle since March last. Keel Ridge Furnace, also at the above-named place, and operated by this firm, will be put in blast at an early date. It has been idle since the first of the year.

About 300 employees of the Lake Erie Iron Company, of Cleveland, Ohio, have stopped work owing to the establishment of the monthly pay system. The men were employed in the nut and bolt department and but recently received notice of the monthly pay system. They were invited to sign an agreement to that effect, but refused and struck. It is thought that the trouble will be satisfactorily arranged in a few days.

The Ivanhoe Furnace, in Wythe County, Va., is expected to be ready to blow in with coke as fuel about October, 1888. It is being remodeled for this purpose, having heretofore been a charcoal stack.

The regular monthly meeting of the Western Wire Nail Association, which is composed of the wire nail manufacturers west of the mountains, was held in the Monongahela House, Pittsburgh, on Friday, the 20th inst. C. B. Beach, of Cleveland, is president, and R. H. Johnson, of New York City, officiated as secretary. The following named firms were represented in person: Pittsburgh Wire Nail Company, Pittsburgh, Pa.; Hartman Steel Company, Limited, Pittsburgh, Pa.; New Castle Wire Nail Company, New Castle, Pa.; Phillips, Townsend & Co., Philadelphia, Pa.; Salem Wire Nail Company, Salem, Ohio; H. P. Nail Company, Cleveland, Ohio; American Wire Nail Com-

pany, Covington, Ky.; Cincinnati Wire Nail Company, Cincinnati, Ohio; Wetherald Wire Nail Company, Findlay, Ohio. The St. Louis Wire Nail Company, of St. Louis, were represented by proxy. Nothing but the usual routine business was transacted. The members present reported the trade to be in a fairly satisfactory condition. The next meeting of the association will be held in Cincinnati about August 20 next.

The annual meeting of the stockholders of the Catasaqua Mfg. Company, of Catasaqua, Pa., was held in the office of the company, on Wednesday, the 18th inst. In consequence of the unprofitable character of the iron business for the past six months, and the unsatisfactory outlook for the future, the semi-annual dividend was passed, for the first time in many years.

The Chandler mine, 25 miles east of Tower, on the main range of the Vermilion district, Minnesota, will commence shipping iron ore on the 1st of August, and will forward 600 tons a day of high grade Bessemer. This mine is expected to be a heavy producer and to rank among the big mines of the country. Joseph Sellwood is superintendent of mining operations.

The Iron Mountain Company, of St. Louis, are rapidly opening up the "new find" of iron ore at their Iron Mountain mines in Missouri, notwithstanding the dull market. Prof. W. B. Potter, who has charge of their operations as consulting engineer, is entitled to the credit of this discovery, which resulted from explorations made on his advice and in a direction indicated to him by a thorough study of the geological formation. A very large deposit of a most excellent quality of high grade Bessemer ore has been opened up, which will again bring this company to the front as heavy producers of ore. Faces of ore from 30 to 50 feet thick have already been exposed in the underground workings.

The foundations for the hot-blast stoves, furnace stack and draft stack of the blast furnace at West Duluth, Minn., are about completed, and the brick masonry of the casting house is well under way by this time. The builders expect to begin placing the columns for the furnace stack about the 1st of August. The size of the furnace will be 75 feet by 16 feet. At West Superior, Wis., across the bay from West Duluth, the proposed pipe foundry has been laid out and the erection of the walls has been put under contract. The initial capacity of this foundry will be 50 tons per day.

The Cherokee Land and Iron Company, of Cherokee County, Texas, have proceeded so far in their plans for developing their iron ore deposit as to authorize John Birkinbine, engineer, of Philadelphia, to prepare plans for a 50-ton charcoal furnace. With the sole exception of the State furnace, three miles distant, this will be the only blast furnace in a radius of 500 miles from the site selected. The furnace will be operated on foundry iron.

The Calumet Furnace, operated by the Chicago Furnace Company, and situated at Cummings, near Chicago, was blown out last week for repairs. This furnace ran a year and ten months on a lining which was merely patched when the present blast was started. It was the third blast on one lining, although both the previous blasts were rather short. The hot-blast stoves will be overhauled while the lining is being renewed, and the furnace will probably start up again in 60 days. Charles Himrod & Co., sales agents, state that a sufficient stock of pig iron is on hand to supply the wants of customers in the interval. While the Calumet Furnace

was being blown out, the Minerva Furnace, at Milwaukee, Wis., operated by the Milwaukee Furnace Company, consisting of substantially the same stockholders, was being blown in, after thorough repairs. The Minerva Furnace will run on a Bessemer contract for the remainder of the year, to supply a local steel company.

In May the first Ensley furnace of the Tennessee Coal, Iron and Railroad Company made 4548 gross tons of pig iron, an average of 1027 tons a week, figures which certainly go far beyond anything yet done in the South. The second Ensley furnace was blown in on the 2d inst.

Some changes have taken place in the management of the Norton Iron Works, of Ashland, Ky. D. B. Meacham, formerly secretary, has been elected vice-president and general manager, and J. K. Pollock has become secretary.

A contract was signed with the Chester Rolling Mill Company at Thurlow, Pa., on the 23d inst. for the construction of a new Bessemer steel plant and blooming mill, with a weekly output capacity of from 2000 to 2500 tons. The new steel mill will be completed early next spring and will employ a large force of men.

Contracts have been made for the cabling of the West Madison street railway in Chicago. The tunnel under the Chicago River at Washington street will be used to secure an uninterrupted connection with the business center of the city. About 2500 tons of cast iron will be used for the yokes and pulleys, and 1500 tons of tank steel for the conduit in which the cable will operate.

Machinery.

William Shimer & Co., engineers and machinists, of Freemansburg, Pa., have commenced the erection of a new foundry, 75 x 100 feet, which they hope to have finished by August 1st next. It will increase their capacity about 50 per cent.

The new car shops of the New York and New England road at East Hartford, Conn., which have cost \$250,000, will be ready in 30 days. The plant includes 30 acres and has accommodations for 1300 cars.

The Excelsior Iron works, 160 North Clinton street, Chicago, Ill., have secured a contract from the city of Chicago for 15 steel boilers for the new water works. These are to be tubular boilers, each 62 inches in diameter and 20 feet long, and containing 49 4-inch tubes. W. S. Mallory & Co. will supply Park Bro. & Co.'s steel for this work.

The Whitin Machine Company, of Whitinsville, Mass., will light their large factories with 170 Waterhouse arc lights, to be supplied by the Waterhouse Electric and Mfg. Company, of Hartford, Conn.

At the Ohio Valley Centennial Exhibition, now open at Cincinnati, the John H. McGowan Company, of that city, exhibit pumps of their make run by air pumped by their Rival air pump into a receiver, from which connection is made, the pumps referred to running the same as if operated by steam. They have also a direct-acting steam pump for use in connection with hydraulic machinery for tobacco manufacturers, which is something new in that line. Eight of the Machinery Hall boilers are being fed by means of their Rival boiler feeder, having been used for that purpose since expositions were first held in Cincinnati. One of their Monitor Rivals feeds the 500 horse-power Heine safety boiler which is supplying power to the hall.

Messrs. Lodge, Davis & Co., of Cincinnati, Ohio, are running full on orders, having just secured a large contract from

Messrs. Lloyd, Booth & Co., of Youngstown, Ohio, for some heavy machine tools. They have also an order for an entire machine-shop outfit for the Wm. Anson Mower and Reaper Company, of Youngstown, who propose moving their entire plant to Chattanooga, Tenn.

During the months of May and June of this year the Babcock & Wilcox Company, of New York, sold boilers amounting in all to 8354 horse-power.

Miscellaneous.

Operations are about to be resumed at some of the iron-ore mines along the East Pennsylvania Railroad between this city and Allentown. Work had been suspended on account of the depressed condition of the iron trade, and the miners found employment among the farmers at haymaking and harvesting at \$1.25 per day. They now return to the mines at 80 cents per day for surface work and 90 cents for underground work. — *Reading (Pa.) Times*.

From the Marquette (Mich.) *Mining Journal* of the 14th inst. we take the following: The season's shipments of ore from the Lake Superior mines now amount to 1,350,369 gross tons, this being 192,980 tons behind the shipments at the corresponding date last year. The shipments for the week ending Wednesday were 155,947 tons, of which amount 32,892 tons went from Marquette, 2020 tons from St. Ignace, 51,854 tons from Escanaba, 48,553 tons from Ashland and 20,628 tons from Two Harbors. The shipments of this week show a slight falling off from those of the previous week, the shrinkage being almost wholly in the quantity sent from Escanaba. The following table shows the shipments by ports for the present season to date, and for the corresponding periods in 1887 and 1886:

	1888.	1887.	1886.
Marquette.....	175,089	290,273	344,246
St. Ignace.....	46,709	34,590	21,778
Escanaba.....	722,407	775,433	534,168
Ashland, Wis..	308,096	353,095	215,795
Two Harbors..	98,068	109,368	99,773
Total.....	1,350,369	1,543,349	1,265,760

The J. M. Schoonmaker Coke Company, of Pittsburgh, have secured an order for 2000 tons of coke, to be shipped to Newfoundland via Perth Amboy, N. J. Some time ago the firm shipped 1000 tons as an experiment. It proved so successful and the coke was so much better than the English product that foundries there ordered more. This opens up a new market for Connellsville coke, which gives promise of developing into a healthy demand. The cost of transporting it from the Connellsville region to Newfoundland is about \$5 per ton.

Messrs. Bornholz & Co., 232-234 Front street, New York, have issued a circular letter in which they announce that they are prepared to buy up all kinds of old metals in any shape, with the exception of iron and steel, specifying more particularly dirt and scraps of tin, solder, lead, spelter, type, &c.; scraps, turnings, filings of copper composition, brass, zinc, &c. To those who have on hand waste material of this kind it may be of interest to submit samples to Messrs. Bornholz & Co.

The Bridgeport Crucible Company, of Bridgeport, Conn., manufacturers of black-lead crucibles and plumbago, report an active business. The company are now under the management of Mr. W. T. Macfarlane, who is well known to the trade, having been formerly connected with the Taunton Crucible Company, of Taunton, Mass.

The Chalmers-Spence Company of New York, whose asbestos goods, more particularly their removable pipe and boiler coverings, are well known throughout the United States, removed their Philadelphia

office July 16 from 32-34 South Second street to 24 Strawberry street.

The Aluminium Brass and Bronze Company, of Waterbury, have decided to locate their works in Bridgeport, Conn. At present the company are receiving bids and estimates on buildings, machinery, &c.

The Phoenix Iron Company.

A very pleasant visit was made on Thursday last to the works of the Phoenix Iron Company, at Phoenixville, Pa. About 20 gentlemen made up the party, which was taken in charge by Mr. G. Gerry White, secretary of the company. The party from Philadelphia included Mr. F. Dundore, J. Meeley, C. S. Tyson, G. M. Newhall, G. A. Carson and the Philadelphia representative of *The Iron Age* and Mr. B. Archer, of Camden, N. J. Connected with the new sugar refinery being built by Mr. Claus Spreckles were Mr. A. B. Rorke, the contractor for the building, and Messrs. Watson and Mueller, engineers, besides several other gentlemen. Two special cars carried the party from Ninth and Green street, Philadelphia, directly to the works, at which point they were taken in charge by Mr. David Reeves, president of the company, and Messrs. W. H. Reeves, Amory Coffin and A. Bonzano, who are in charge of various departments of the Phoenix Iron Company's works. The first visit was to the rolling mills, which are 930 feet in length, with 430 front, one of the largest and best equipped mills in the country. The mills were at work rolling steel shapes for the Government cruisers now being built by the Cramps for the U. S. Government, as well as on various other work, including some for the Spreckles refinery. The next building visited was the erecting shops of the bridge works, in which were seen vast quantities of material for shipment to various parts of the country, one portion of upward of 6000 tons being for the new bridge over the Ohio at Cincinnati. The party were next taken to the drafting rooms, in which 40 to 50 draftsmen were at work getting out plans for other work expected to be taken later on in the season. Models of a very interesting character were also shown, explanatory of the various modes of constructing and securing these immense bridges in position, which were of special interest to the engineers. The three blast furnaces were also visited, as well as the blooming mill and new open-hearth plant, which is now being constructed for the company, and which is to be completed at an early date. The establishment, employing about 2000 hands all told, proved to be altogether beyond what could be gone over in a half day's visit, so that a mere glance was about all that could be given to many interesting features. After leaving the works the party were taken to the residence of Mr. David Reeves and were handsomely entertained, returning to the city about 9 p. m., the entire party feeling that they had not only spent a most enjoyable day, but had received enlarged ideas in regard to the magnitude and importance of Pennsylvania's leading industry.

The Calumet and Hecla copper mine has been so far exhausted of water introduced to extinguish the fire that rock from the old workings will once more be hoisted out by the close of this week.

A large deposit of red hematite ore suitable for the manufacture of paint has been found near Monroe, Jasper County, Iowa, and a company is being formed to mine it for that purpose. It is reported to be 20 feet thick and to cover an extent of 200 acres.

The Iron Age

New York, Thursday, July 26, 1888.

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Dissolution of an Iron Manufacturers' Association.

For several years the iron manufacturers of Pittsburgh and points further west have maintained an organization known as the Association of Manufacturers of Iron, Steel and Nails. Its principal object was to unite the manufacturers of that part of the country in support of a common policy on the labor question, to meet the issues presented by their workmen, organized as the Amalgamated Association of Iron and Steel Workers. Committees of conference from these two bodies have met annually to discuss rates of wages, and if no cause of disagreement arose they would adopt a scale which was binding on both parties for 12 months from the 1st of July. This year, it is almost unnecessary to say, there was a disagreement, the manufacturers desiring a reduction of the scale on account of the low price at which they were obliged to sell their products, while the workmen insisted on preserving the old rates. The officers of the manufacturers' association and many of the firms composing the membership positively asserted that the reduction of the scale was asked in good faith, and that their rolling mills were prepared to lie idle for months if this concession was not made by the workmen or if trade did not improve sufficiently to make the old scale equitable. On the first Monday in July a general shut-down of the Western rolling mills was made and the struggle began. The signing of the scale by several firms during the first week was conclusive evidence that the manufacturers were not presenting a united front, but the officers of their association stated that they expected these defections for special reasons. More followed in the second week, and their action was also explained on special grounds, but by the beginning of the third week it became plainly apparent that only a portion of the manufacturers would be left to continue the contest. They did not propose to keep their mills standing idle, however, and see their trade falling into the hands of competitors, and on the 18th inst. the Conference Committee of the association met at Pittsburgh and concluded to dissolve, releasing the members from all pledges regarding the starting of their works. This is accepted generally as a dissolution of the organization, and some of the manufacturers of Ohio are already discussing the formation of a new association to look after their local interests.

For several reasons, which it is unnecessary now to discuss, this is a bad year for labor contests, if they can be avoided. A number of the manufacturers must have been of this opinion, or the disintegration of their forces would not have been so rapid, and would not have

included so many prominent establishments among those which first yielded. There are some, however, who sincerely believed that the trade conditions required a lowering of the wages scale, and who earnestly desired a contest to be fought out on this line if their mills had to lie idle for months. They are inclined to take a gloomy view of the collapse of the manufacturers' strength and look forward with apprehension to the future. The lower wages paid in the East are alleged to give the mills of that section an advantage in markets which are claimed to belong naturally to Western manufacturers. At all events the Eastern mills will be better able to hold their own against Western competition now that Western wages are to be maintained at the old level. If serious results to Western manufacturers follow the action which has thus been forced upon them by some of their number, a bitterness of feeling will be created far surpassing the chagrin now manifested by those who were in favor of heroic measures. The dissolution of the Manufacturers' Association is the first important event indicating ill feeling.

This disruption of an association which had existed for years is variously regarded. The leading members of the Amalgamated Association are reported to deplore it, because they preferred to treat with a committee representing all the mill-owners rather than with each manufacturer separately. Some of the principal iron companies also regret the occurrence very much, as they fear that the strength of the labor organization will be increased in the proportion in which the manufacturers have divided their power. There are others, however, and they are by no means few, who regard the whole matter with indifference, alleging that the association merely existed for the transaction of business which each member was perfectly able to take care of himself, and that it will be found in time that no harm has been done to anybody by the abandonment of a conference committee which only nominally represented the mills. Its importance was largely fictitious, owing to the great changes which have of late years taken place in the Western iron trade, and through which the interests of manufacturers do not lie so much in common as was once the case. Many mills now devote their attention to specialties, instead of making finished iron and steel for the general market, and only in the primary processes of manufacture do they find themselves in line with their neighbors. Sufficient uniformity may exist to make a general scale of wages applicable, but, as to times and seasons of dullness and brisk trade, special considerations enter which will prevent a simultaneous shut-down, unless it is agreed upon long in advance, and every manufacturer then makes his preparations for it in good faith. Evidently this was not done in anticipation of the lockout of July, 1888.

The announcement that a delegation of American glassworkers sailed for Europe on the 21st inst., to endeavor to "organize" the Transatlantic glassworkers, recalls the effort made from 1870 to 1872 by American ironworkers to induce their English co-laborers to demand better wages. The details of the scheme were

not made public, but labor agitators were quietly sent from this side to show English workmen how much more they ought to receive for their labor than they were being paid, citing the rates of wages ruling on this side of the ocean as evidences of what men were entitled to in their occupations. The result of the mission was beneficial to some extent, as wages were raised at numerous works in compliance with the demands made, but a depression in trade soon after came on, and the advance was lost in spite of very extensive and protracted strikes, in which the supply of labor was shown to be hopelessly in excess of the places to be filled. The professional labor agitator will find abroad a good field to work in, and he will be entitled to genuine praise if he can not only succeed in elevating labor, but can also permanently sustain it on a higher level.

Important Acts of the Legislature.

The New York Legislature met on Tuesday, 17th inst., in extraordinary session, the special object being to provide for the employment of convicts in the State prisons, and its proceedings lasted four days. Messages upon other topics were received from the Governor from day to day, but none excepting those relating to labor and the Aqueduct were acted upon. Senator Fassett, Chairman of the Aqueduct Investigating Committee, was gratified in the passage of a bill by a decided vote, abolishing the present Aqueduct Commission and substituting a board composed of Mayor Hewitt, Controller Myers, Commissioner Newton, of the Department of Public Works, and four citizens, two Republicans and two Democrats, to be appointed by Mayor Hewitt. Moreover the act gives the Mayor of New York and the Governor authority to remove on charges the Aqueduct Commissioners—a power, it is said, which they do not now possess. The Governor has already approved the bill. Mayor Hewitt pronounces it a step in the right direction, and says he will appoint as commissioners four of the most independent men he can find, who will outvote him every time he is wrong.

No small share of interest was concentrated on the prison labor question. The measure adopted is known as the Yates bill, which was defeated in the regular session. It provides the sum of \$250,000 and abolishes the State account system. It declares that none of the goods made in the penal institutions of the State shall be sold except to the State charitable institutions. The convicts henceforth shall do no labor except hand labor, the use of machinery in the prisons being forbidden. It is to be deprecated that a measure so radical could not have had more deliberate consideration than was possible at a special session, especially as it is so much entangled with the labor question as represented by trades unions in prospect of the pending election. A recommendation of the Governor concerning a modification of the conspiracy laws, and which originated with the Central Labor Union, was allowed to slumber until some future occasion. At best the Yates bill can only be regarded as a temporary expedient adopted in deference to the labor vote. It is hardly possible that the State ac-

count system, with all its plant of valuable machinery and well organized processes, to say nothing of the skill acquired by men during their confinement, fitting them for future usefulness, will be so summarily done away with.

The Western Iron Trade.

Fires, accidents, labor disputes, lack of business and insolvency have latterly been operating with unpleasant harmony in suspending activity at quite a large number of Western iron establishments. Taking also into consideration the nail factories and steel works now running on part time only, the diminution of production has been very heavy, and, if the depression in business can be cured by a curtailment of the output of iron and steel, the remedy is being administered in doses which ought to insure speedy recovery. Undoubtedly the first step toward securing a better condition of the trade is to adjust the supply to the demand. Prices will then cease to decline. After that other circumstances must determine the extent of the demand—its growth or decay.

Judging from the recent course of prices it would seem that—in the West at least—the supply had been brought down to proper dimensions to suit the demand. Bar iron has been quite steady; pig iron appears to have touched bottom; plate iron is firmer and wrought-iron pipe resists attempts to force it lower. The association of Western bar-iron manufacturers, formed at Cleveland on the 27th ult., will, if it meets the expectations of its promoters, assist still further in preserving the proper relations between the supply and the demand and will extricate the trade from its present unsatisfactory condition. While Bessemer pig iron is the only kind in which there has thus far been an actual advance in price, other classes of pig iron are not being offered so freely, and shrewd buyers are quietly absorbing the cheap lots on which they had been given option some time since. The cheapest grades of Southern iron are firmer and not so abundant as they have been. Even old rails are not so weak as they were a month since, when free offerings met with a quick response from buyers, which soon changed the tone of the market.

But the conditions now prevailing seem to favor a better state of things than merely a balance of the supply and demand. It is true that orders for steel rails are far below the capacity of the mills, and that a very important branch of the iron and steel trades is thus deplorably dull, yet railroad building has not been suspended this year, and the new mileage so far laid surprises nearly everybody, while the prospects for the closing months of the year are fairly bright. A better demand for rails will surely be felt in the next six months. Even now large orders could be taken if bonds would be accepted in whole or part payment for them. With abundant money and with idle capital accumulating in our financial centers it would be strange if the best of the projected railroad enterprises should not be undertaken while rails and other railroad material as well as labor can be had cheap. The fact that this is Presidential year may influence some enterprises, but there are plenty of others which will be pushed

without regard to that disturbing influence. The crop prospects are also continually improving, and the indications are that we shall not only raise enough for our own wants, but that we shall have something to spare for export. With our farmers prosperous the nation is blessed. A direct result of their prosperity is the heavy trade in agricultural implements which is now in progress, and which in some lines surpasses all previous experience. Three of the largest manufacturers of harvesting machinery in the Northwest state that by the 1st of August they will have empty warehouses, whereas they usually carry over a good stock to the following season. Their orders for material to be worked up into farm machinery for next year will be larger than ever, and the iron and steel trades may expect to be correspondingly benefited. When these abundant crops, which now seem to be assured, begin to be moved, the railroads of the West will be lifted out of the Slough of Despond, and their increased earnings will enable them to make sorely needed repairs and add to their equipment, also with benefit to the iron and steel trades. The collapse of the Western rolling-mill lockout is far from being a calamity under these circumstances. Individual manufacturers may suffer loss or receive no profit from the operations of their mills because their workmen are paid a higher rate of wages than present selling prices justify, but the country generally is the gainer by the resumption of activity in an industry employing many thousands of well-paid men and consuming materials whose production and transportation employ other thousands.

Much more of an encouraging nature could be gathered from the situation, but it is not our purpose to enter fully into such details, as a wrong impression would be created. The prospects are not favorable for a "boom" by any means, but, on the other hand, those who are waiting for prices to settle still lower in consequence of a more depressed state of trade should heed the conditions now existing and not defer their purchases too long. The evident holding back of orders for the past three months, and the large consumption going on, must have resulted in low stocks in many lines of goods throughout the West, and if a general buying movement should set in a sharp advance would result. This is not desirable and would not be beneficial to business in the end, as the inevitable reaction would cause business to sag again, with the usual unsatisfactory results to buyers and sellers.

It is a matter of congratulation to the members of the iron and steel trades that the present severe depression in business and the long-continued decline in prices have not been accompanied with numerous and important failures. Few have been reported thus far, and of them the most conspicuous have been caused by outside operations apart from the legitimate conduct of their business in manufacturing iron or steel. This argues a soundness of financial condition among our manufacturers which is indeed highly gratifying, and at the same time speaks volumes for their generally excellent management, through which this has been secured.

A Tin-Plate Industry.

The tin-plate question has been so thoroughly discussed in public and in private for years that it would seem almost impossible to present a new phase. Yet there is a new view of it to be taken, and possibly it may upon examination be found to be an important one. Nobody is satisfied with the present rate of duty imposed on tin plate. It offers no inducement to capitalists to embark in the business of manufacturing tin plate, as they cannot figure out a possible profit on the investment of capital and the expenditure of time and energy required to equip and operate the works, when tin plates can be laid down in this country so cheaply, paying 1 cent per pound duty, by the Welsh and English makers. Nor are the American consumers of tin plates pleased with the existing arrangement. The duty of 1 cent per pound appears to them to be a wholly unwarranted tax on their business, as the revenue derived from it is not required by the national Government, and has proved to be of no use in building up, under its protecting influence, a tin-plate industry in this country. The manufacturers of black and galvanized sheet iron and their special customers defend the duty, not because they deem it right in itself, but because their trade will be seriously disturbed if tin plates can be brought into this country at a considerably lower price than is now charged for them.

The rate of duty, from present appearances, bids fair to be continued as it now stands, notwithstanding the determined effort which has been made on the one hand to remove it and the urgent appeals from important interests on the other hand to double it. If it remains at 1 cent per pound what will be the outcome? Will those who desire to see a tin-plate industry established in this country continue their slow course of agitation and education in favor of higher duties, hampered meanwhile at almost every session of Congress by appeals for the total abrogation of the duty? The last serious attempt to advance the duty was made in 1883, when the tariff was revised largely upon the lines laid down by the Tariff Commission. The commission recommended a duty favorable to the views of the advocates of an American tin-plate industry, but a Congress of protectionists refused to be guided by their advice and even reduced the duty from the old rate of 1½ cents. From 1883 to 1888 what has been done? Five years have really been wasted.

The vital point to-day in the discussion of the tin-plate question, in the light of the possible creation of an American tin-plate industry, is that no attempt is being made at the actual establishment of thoroughly-equipped works on this side of the Atlantic. Quires of foolscap have been wasted in writing on the subject and bewailing the unfortunate position of America in not supplying her own wants in this important branch of trade, but nothing tangible is being done, and years and years are being allowed to slip by unimproved. Those who say that higher duties will start the wheels of enterprise and set them in active motion are told that protective duties are intended to protect something in existence and not to create industries, if indeed they are not told that

higher duties would be useless because the art of making tin plates is not understood by our people.

It is suggested that it rests plainly with the advocates of an American tin-plate industry to get together, subscribe the necessary capital, build tin-plate works, operate them, show that good tin plate can be made here, publish the actual figures of cost from their books showing what can be done under the most careful and economical management. Then it is urged they may trust to the good sense and patriotism of the American people to do what seems to be right afterward to continue the start thus made toward founding a new industry. It is insisted that the manufacturers of sheet iron, of galvanized iron, of roofing materials and of all other articles affected by the condition of the tin-plate trade are the people who should contribute to an experiment of this kind and do all in their power to make a practical test of the tin-plate question. It is argued that if they do not there is little hope that the end they desire can be accomplished, while there is every prospect of increased protests from consumers having the effect in time of entirely wiping out the tin-plate duty.

Engines of a class now but seldom met with in large sizes are those of the trunk type, which in past years, working under low pressures, have been known to give very good results. With the main peculiarities of their design many of our readers are no doubt familiar, the pistons being made of cast iron, and, with their trunks, constituting really open-ended cylinders working through large stuffing-boxes in the covers of the engine cylinders proper. In virtue of this construction piston-rods were entirely dispensed with, and the connecting-rods were directly attached to pins bolted to the pistons inside the trunks. The compactness secured in this way was the chief advantage gained, especially for use on board ship, where economy of space is always an important desideratum. In this respect the engines compared favorably with those of the oscillating type, admitting, moreover, as the latter also, of being so placed as to bring the center of gravity to a low level. Even with low pressures, however, considerable difficulty was experienced in keeping the trunks in a steam-tight condition, and the exposure to the atmosphere of large surfaces coming in direct contact with the steam in the cylinders gave rise to appreciable losses from radiation and condensation. In these circumstances may be found a partial explanation of the relegation of the trunk engine to comparatively light work, for which we still find it sometimes used, some of the older makers of small hoisting plants supplying examples. One of its features, which we did not mention above, is the absence of crosshead and guides. It is on this account that trunk engines are always worked in the opposite direction to ordinary engines, no downward thrust of connecting-rod being thus added to the weight of the piston and trunk to be supported by the cylinder surfaces. This weight alone is very often considerable and would scarcely admit of being increased without causing great wear. With the direction of revolution adopted the thrust of the connecting-rod is always

upward, and the weight resting on the cylinder surface is therefore only the difference between the two.

Naphtha Launch Engines.

Elsewhere in this issue we publish results of several tests which were made at Stevens Institute a short time ago with the view of determining the cost of power in the recently much-talked-of naphtha launches. The results are at the present time specially interesting, bearing out in a great measure the truth of the claims made for the engines in point of economy, and moreover opposing, though only apparently, much that has hitherto been regarded as incontrovertibly established by the accepted laws of thermo-dynamics. Experiments which have been conducted in England within the past few weeks with practically the same type of engine as that used by Messrs. Doty and Beyer in their work at Hoboken have, in addition, given results which tend to thoroughly sustain the conclusion that, as compared with steam, naphtha vapor is much the more economical working fluid in an engine cylinder. It is greatly to be regretted, however, that the conditions under which the Hoboken tests were made did not admit of giving the subject as much time as its importance warranted, and some very desirable comparisons had, therefore, to be omitted, the work thus being left incomplete, though still in such shape as to indicate about what might be expected. We refer particularly to the fact that the engine was tested under naphtha alone, no steam test being made, and no comparison of the powers developed and actual costs of running with the two fluids therefore being possible. We are glad to know, however, that this matter will receive special attention in another and more extensive series of trials shortly to be carried out at Stevens Institute. In the present instance, moreover, the engine, as the published indicator diagrams show, worked under the disadvantage of late valve opening, and attempts to run at a speed higher than that obtained—about 280 revolutions per minute—proved unsatisfactory. The power developed, therefore, fell short of the full capacity, being a little over 0.9 horse-power for each of the three cylinders, or, according to the table of results, a total of 2.8 horse-power, and with the ruling market price of naphtha at the time of the test the cost per horse-power per hour was 6.2 cents. It is in this figure probably more than in any of the other results arrived at that interest will chiefly be felt, though here, as well as in the determination of the quantity of water necessary to condense the naphtha vapor exhausted from the engine, the want of a basis for comparison will be keenly experienced.

In the absence, for the present, of this information from the report before us, it is of interest to turn to the records of the English trials, in the course of which naphtha and water were used alternately. The trials themselves, as reported in the *London Engineer*, consisted of continuous runs of three hours' duration, over a measured distance, during which, at frequent intervals, indicator cards were taken, and the number of revolutions of the engine and the speed of the launch recorded. The difference in power developed was

very marked, and the speeds were found to be practically those due to the differences in power, confirming thus the correctness of the diagrams. When running with naphtha the mean results of four trials were as follows: Cylinder pressure, 84.85 pounds; revolutions per minute, 263; indicated horse-power, 2.588. For steam, under precisely the same conditions, the figures were, 15.09, 141 and 0.598 respectively. These results, we need scarcely say, may be studied with a good deal of interest. The English experiments showed also that with steam the engines developed about 1 horse-power for every 17 square feet of boiler heating surface, while with naphtha barely 4 square feet were sufficient to accomplish the same work, the reduction of boiler weight per horse-power when using naphtha being thus very remarkable. It is interesting to note here that in the case of the engine tested at Stevens Institute a very close approximation to one of these figures was obtained. The heating surface of the boiler there used may be taken according to the given dimensions as about 12 square feet, not sufficient, if we accept the customary rating for steam boilers of 15 square feet for each horse-power, to develop one horse-power when working with steam, and yet giving with naphtha a little over 2.8 horse-power, or a proportion of about 4.2 square feet of heating surface to each horse-power. Assuming, as was actually the case in the English trials, that equal amounts of heat are supplied to the boiler both when running with steam and with naphtha—or, in other words, that the quantities of stored up and available energy are the same in both cases, it is obvious that the superior result obtained with the naphtha vapor is entirely due to the fact that the proportion of this energy held by it which can with present methods be converted into useful work; is greater than that which can be obtained from the steam. A comparison of the latent heats of evaporation and of the methods of condensation which are necessarily employed will more clearly illustrate this. For the present, therefore, it may not unreasonably be questioned whether successful competition of a non-aqueous vapor with steam is so entirely impossible of achievement as it has been generally represented to be. In any event, further investigation both here and abroad bearing upon the merits of the naphtha engine will be followed with interest.

The contest over railroad freight rates in Iowa continues very interesting. A strong protest has been made against the new rates fixed by the State Commissioners, the railroad companies claiming that the schedule adopted was ruinous to them and that it was much lower than the rates paid in more populous sections of the country. Their appeal to the courts to interfere in their behalf has already been referred to in these columns. In view of this litigation the commissioners are advising shippers to pay the rates charged in excess of the tariff under protest and to await the final decision of the matter. In the meantime, shippers are sending to the commissioners, to be used in evidence in the courts, bills of lading on all the different roads interested, showing rates paid from one-fourth to one-half less than the

new State tariff, and these rates were voluntarily made during the period extending from December to June. Nearly 1000 of these silent but powerful witnesses against the railroads had been received up to last week and more will probably follow. They will establish a justification of the action of the commissioners which will be difficult to combat. Evidence has also been submitted to show that the Iowa tariff is not lower than on Eastern roads in populous districts, the rates submitted as charged on the Pennsylvania Railroad being one-half lower. Whatever the outcome of this contest may be, it is evident that the Iowa shippers are determined that they will secure more considerate treatment from the railroad companies traversing their State.

The great "Q" strike, like Banquo's ghost, will not down. Although the company's officials have professed to ignore the existence of a strike, the financial statements published show that a surplus of \$1,000,000 at the end of last year has by some means become converted into a deficit of \$3,000,000, which can be accounted for on the theory that the company and the discharged engineers are engaged in a relentless struggle. Chairmen Hoge and Farrell, of the local Grievance Committee, agree that there are 1600 engineers and firemen now in idleness who are drawing on the treasury of the order at the rate of more than \$1,500,000 per annum. Already the expenditure exceeds \$800,000, according to common report, and it is not difficult to believe that on either side the situation is becoming desperate. Contemplating this whole affair, no friend of law and order has reason to regret that the courts are at last compelled to take cognizance of the facts in the case. It is alleged that an overt act has been committed in the placing of dynamite upon the tracks of the "Q" road, thereby hazarding life and property. Upon this showing no compromise is admissible apart from the infiction of penalties that shall fully vindicate the majesty of the law. The most serious fact in the situation is the attitude of the Brotherhood of Engineers in its relations to the alleged offenders, which is equivocal, to say the least. Chairman Hoge, of the striking engineers' Grievance Committee, and Chairman Murphy, of the firemen's committee, are among those now out on \$5000 bail, charged with being deeply implicated in the conspiracy. Despite this fact the singular spectacle is presented of these men "virtually doing the company's work," as explained by the counsel for the prosecution, at whose request the trial, to have taken place on the 21st, was postponed to July 28th—the alleged conspirators meanwhile making an extensive tour among their disaffected compatriots at St. Joseph, Galesburg, Creston, Atchison, Hannibal, Quincy, &c. Already the ominous intelligence comes from Chairman Hoge, at Omaha and St. Joseph, that "the votes thus far taken are practically unanimous for continuing the strike," all of which may be construed as a rejection of the terms offered by Arthur and the "Q" officials, and a resolve to persist in the ruinous course which Hoge and others seem to have marked out for themselves,

possibly once more stopping the interchange of freight by all connecting roads. But the courts remain to be heard from. Clearly enough the course of events fore-shadows a disruption of the Brotherhood, by which process it will be purged of the radical element.

CORRESPONDENCE.

Nickeline.

In reference to the inquiry which we published last week for the address of the makers of "nickeline," we have received from Messrs. Belcher & Loomis, 60 to 64 Weybosset street, Providence, R. I., the following letter, addressed to our correspondent, "J. B. K.":

"We answer your inquiry for nickeline by stating that it is made by the Wessell Metal Company, 521 West Twenty-fourth street, New York. We are selling agents, and the price in 100-pound lots only is \$1 per pound, the metal not being thinner than No. 25 by the Brown & Sharpe gauge.

"In this connection allow us to call attention to another metal, for which we are also agents, called Corinthian Silver. This also is as white as nickeline, and possesses the same non-tarnishing quality. It differs from nickeline in that it can be shaped, raised, spun or struck up in any form, the same as sheet brass. Nickeline will not do this, being very hard and stiff, like a plate of steel. The price of Corinthian Silver is 60 cents per pound up to No. 20 A B gauge in any quantity. We are selling just now large quantities of this to manufacturing jewelers, who make it up into ornamental boxes and charms and ornaments to hang on the watch guard, and which they probably sell for silver. In fact, it is better than silver, because it holds a beautiful polish and will not tarnish or change color. In wire it costs 15 cents more. Thinner than No. 20 is advanced 1 cent per pound for each number up to 26 and 2 cents for each number above 26 to 36."

The Chicago Smelting and Refining Works.

E. A. C. Du Plaine, proprietor of the Chicago Smelting and Refining Works, has erected a building specially adapted to his business at 240 South Jefferson street, corner of Congress, Chicago. His old quarters at 64 and 66 South Canal street, which were sufficiently large in the early days of the establishment, were outgrown, and more extensive facilities have for some time been required. In the new building referred to, the arrangements are such as to insure the operation of every department to the best advantage. The works occupy a lot 30 feet in width by 125 feet in depth. The foundry department has a capacity of two No. 150 crucibles, two No. 80 crucibles and two No. 50 crucibles, equal to 4000 pounds of brass or bronze daily. The necessary core ovens and molding tubs are provided. The building is very light, ample room is given to the machinery, and wherever improved appliances could be introduced they have been used, so as to secure the highest efficiency.

The list of products made by Mr. Du Plaine is quite extensive, embracing bronze or brass castings, phosphor-bronze, nickel-bronze, architectural or ornamental work, and United States standard gun metal work of any required weight for machinery, engines, rolling mills, mining pumps and railroads. A special plant is employed for making anti-friction or Babbitt metals, tin-smiths' and plumbers' solder, plumbago and nickel Babbitt, stereotype and electro-

type metal, coffin and fusible alloys, &c. The erection of the new works enables Mr. Du Plaine to add the assurance of prompt execution of orders to the guarantee that the goods ordered will be of the best quality.

The Strike at Singer, Nimick & Co.'s Works.

A conflict of no little importance is now being waged at Pittsburgh between Singer, Nimick & Co., Limited, the well-known steel manufacturer of that city, and the Knights of Labor, the outcome of which is being anxiously watched for not only by the parties directly interested, but by other manufacturers and labor organizations all over the country. The differences which led to the trouble are somewhat different from those frequently occurring between firms and their employees, as the controversy is not one of wages, but was caused by the firm arriving at the conclusion to conduct their business in the future independent of the Knights of Labor, the Amalgamated Association or any other labor organization. Last May the firm announced that a 10 per cent. reduction in wages would be made, to take effect on the first day of June. The majority of the workmen belong to the Knights of Labor, while a few are members of the Amalgamated Association. The men decided to accept the reduction, and continued at work without interruption until the annual meetings of the above-named organizations, which were held in Pittsburgh last month. As soon as the officers of these organizations learned that the men had accepted a reduction in wages without being authorized to do so they were at once notified that they must demand the restoration of the reduction or be expelled from their association. The men at once complied, and when a return to old wages was refused struck, the works being closed down in all departments. On Wednesday, the 27th ult., the firm announced that all their employees had been discharged, and that any person wishing to enter their employ must do so independent of any labor organization—or, in other words, the firm had decided to employ only non-union men. The firm later announced that the 10 per cent. reduction in wages had been withdrawn, and the same wages would be paid as before the reduction was ordered. The action of the firm in discharging all their employees was wholly unexpected by the Knights of Labor and the Amalgamated Association, and at a joint meeting of these bodies it was decided to notify all their members to remain away from the works until the trouble is settled. Any member who resumes work without permission will be at once black-listed. Up to this time the firm seem to have decidedly the best of the situation, as about one-half of the works are in operation, and applications are being received every day from old employees who wish to return to work.

It is confidently predicted that inside of a month enough men will have been secured to run the works full time in all departments. In view of some very disastrous defeats which the Knights of Labor have suffered in Pittsburgh during the present year, it is safe to assert that that organization is not the power it once was. It sustained a defeat some months since at the hands of Park, Brother & Co., Limited, proprietors of the Black Diamond Steel Works in that city. The plant of this company is one of the largest in the country, and its employees are all non-union men. No labor organization of any kind is recognized. Only a few months ago Carnegie, Brothers & Co., Limited, proprietors of the Edgar Thomson Steel Works, administered a crushing defeat to this organization which came well nigh

disrupting it altogether, and now comes Singer, Nimick & Co., Limited, who bid fair to do the same. From these facts the deduction is drawn that the Knights of Labor are slowly but surely losing their hold, and that in time the organization will exist only in name, so far as the Western steel mills are concerned.

Washington News.

(From Our Regular Correspondent.)

WASHINGTON, D. C., July 24, 1888.

The Tariff Reduction bill of the Committee on Ways and Means, after a long and tedious discussion, has at last passed the House of Representatives. The vote, as is known, was: Yeas, 162, and nays, 149. This gave the bill 13 majority, which was larger than was expected by the friends of the measure. The illness of Mr. Randall had something to do with the scattering of his followers, who originally numbered eight, and fell to four when the vote was taken.

Chairman Mills has had a very carefully compiled table prepared, which shows the operations of the bill upon articles placed on the free list and in the schedules. The following is the official exhibit:

Free List	1887.—Importations.		Average ad val'm under	
	Value.	Duties.	Present per cent.	Proposed per cent.
Wood, salt, hemp, chemicals, metals, &c.....	\$61,672,120	\$16,799,450	27.24	.....
Wool.....	18,206,988	5,390,054	29.00	.....
Total free list	\$79,879,108	\$22,189,504	27.78	.....

Schedules.	Importations of 1887.		Estimated		Average ad valorem under	
	Values.	Duties.	Duties under proposed bill.	Amount of duties remitted.	Present per cent.	Proposed per cent.
A. Chemicals.....	\$5,060,325	\$2,012,121	\$1,133,847	\$878,274	39.84	22.45
B. Earthenware and glassware.....	10,492,067	6,920,108	5,163,820	1,756,288	65.96	49.21
C. Metals.....	16,152,789	8,456,847	6,976,375	1,480,473	52.35	43.19
D. Wood and woodenware.....	889,559	307,805	260,218	47,587	34.60	29.25
E. Sugar.....	68,897,102	56,515,602	45,223,514	11,292,088	82.04	65.04
F. Tobacco.....	26,441	21,567	10,064	11,502	81.57	38.06
G. Provisions.....	3,235,988	1,711,806	1,890,321	831,485	52.89	42.65
I. Cotton and cotton goods.....	2,423,585	1,233,600	955,989	277,610	50.90	40.00
J. Hemp, jute and flax g'ds.....	17,434,514	6,228,310	4,185,955	2,042,356	35.72	24.01
K. Wool and woolens.....	42,448,127	29,256,443	16,925,862	12,330,581	68.92	39.87
M. Books, papers, &c.....	57,298	13,982	10,425	3,557	24.40	18.19
N. Sundries.....	11,221,253	4,984,936	3,905,795	1,079,141	44.42	34.79
Total dutiable.....	\$178,329,049	\$117,663,127	\$86,132,185	\$31,530,942	65.98	48.30
Total free list.....	79,879,108	22,189,505	.....	22,189,505	27.78	.....
Total.....	\$258,208,157	\$139,852,632	\$86,132,185	\$53,720,447	54.16	33.36

It will be seen that the aggregate average ad valorem reduction in the free list is 27.78, and under the schedules of dutiable articles from 65.98 per cent.; the present average standard of protection, down to 48.30 per cent.

The Senate Sub-Committee on Finance closed their hearings for the present last week. A delegation representing the metallurgical interests under the bill, consisting of H. W. Oliver, John Kennedy and Robert G. Bushnell, of Pittsburgh; Cyrus Elder, of Johnstown, and Charles J. Gilpin and J. M. Swank, of Philadelphia, gave the committee the benefit of their knowledge and experience in this important branch of industrial enterprise and activity. In the Senate bill cotton ties are left at 35 per cent. ad valorem; tin plate at 1 cent., and steel rails $\frac{1}{8}$ cent a pound.

The House bill has been referred to the Senate Committee on Finance. That com-

mittee is ready with its substitute, but there seems to be a hitch in the proceedings. The Republican Senators are divided upon the expediency of embarking in a long tariff debate at this unusually late date in the duration of a session of Congress. The opponents of discussion favor reference of the Mills bill to the Committee on Finance, with authority to sit during the adjournment of Congress and with instructions to take testimony and mature a bill making a reduction of \$70,000,000 of revenue by repeal of the tobacco tax and duties on sugar and alcohol used in the arts, together with such an adjustment of duties as may be in harmony with the maintenance of the principle of protection of home industries. The other wing favor reporting a substitute for the House bill forthwith and pending the debate continue their hearings.

The Democrats, upon the advice of the President, favor discussion. The President is not satisfied with the debate in the House. He regards it there as having been of a sectional character viewed from the standpoint of the interests of the district represented by the Speaker. In the Senate he expects a broad national view to be taken of the doctrines enunciated in his message, which will represent it to better advantage. The Republicans will hold a caucus to determine their course. It will require a unanimous vote on their part to postpone, as the Democrats will be equally solid on the other side. If the tariff debate is once begun in the Senate the middle of September will have arrived before the end of the contest will have been reached. The Senate will doubtless have passed their substitute. The question will then be thrown into conference. The conferees will disagree, pending which Congress will adjourn. The two propositions, the House bill and the Senate substitute, will then stand side by side with the people in the campaign to decide for

themselves as to the safest and surest method of reducing redundant revenues.

The Attalla Furnace.—The Attalla Furnace Company, of Chattanooga, Tenn., of which L. S. Colyar is president, D. J. O'Connell is vice-president and D. W. Hughes is secretary, are pushing work on their furnace at Attalla, Ala. The stack is to be 55 feet high by 11 feet bosh, equipped with cast-iron stoves of special pattern, with 60 pipes, and two boilers, each 54 inches in diameter and 28 feet long, and two 18-inch flues. The Weimer engine has a 26-inch steam cylinder and 60-inch blowing cylinder, with 4-foot stroke. The iron cast-house is 55 x 100 feet. Of the three stock-houses two are 50 x 150 feet and one 50 x 300 feet, with elevated tracks and a full equipment of tracks for all other purposes. The foundations are now complete and all the ironwork is on the ground.

All the machinery is contracted for and will be on the ground by October 1, and it is expected that at the latest the furnace will be in blast on January 1, 1889. The furnace is to be run with charcoal, with a view of making high grade car-wheel iron. The ore to be used is what is known as the Dirt Seller vein, obtained near Round Mountain, 30 miles from Attalla, on the Rome and Decatur Railroad. Iron has been made from this ore long before the war, and was used quite extensively in the mixture at the Confederate States Gun Foundry, at Selma. For car-wheel purposes and for requirements calling for great strength the iron made from this ore has acquired a reputation.

Rapid Transit in Chicago.

The South Side Rapid Transit Company, of Chicago, deposited \$100,000 with the city treasurer on the 20th inst., in compliance with the terms of the ordinance empowering them to build and operate their elevated railroad. The line is to be completed for one mile from Van Buren street within two years, or this money will be forfeited. The route to be traversed by the road is as follows: Commencing at the North line of Van Buren street, at some point between Dearborn and Wabash avenue, and running southwardly over such lots, lands and property as the company now own or hereinafter may acquire between Dearborn street and Wabash avenue to a point to be selected by the company between Thirty-seventh and Thirty-ninth street, thence eastwardly or south-eastwardly, to a point to be selected by the company between Dearborn street on the west and Forest avenue on the east, at which point to cross the city limits. The right of way to be acquired must not exceed 80 feet in width, except at curves and termini and at intermediate stations. The right of way must be parallel with and immediately adjacent to an alley or alley lines. The structure in style, strength and architecture is guaranteed to be equal to the best in New York, Brooklyn and Boston. The rate of fare to be charged is not to exceed 5 cents per passenger for any one continuous trip within the now city limits. It is understood to be the intention of the company to construct three tracks. This will enable them to mass the cars and run through trains into the city in the morning and out of the city in the evening on the third track, while the regular local trains, stopping at all stations, will be run on the other two tracks. Condemnation of property for the right of way has already begun.

Superintendent Bell of the Foreign Mails Service has received a copy of a contract concluded in January last between the Government of the Argentine Republic and Robert P. Houston, of England, by which the latter agrees to construct ten steamers of at least 4000 tons burden and 16 knots per hour each, to ply between the north of Europe and the ports of the Argentine Republic, and four steam launches for emigrant service in Europe; also four steamers to ply between the United States and the ports of the Argentine Republic. The Government of the Argentine Republic guarantees a loan of 5 per cent. per annum on £1,250,000 for the European service, and 5 per cent. per annum on £360,000 for the United States line.

With a weight of 20,000 pounds on each driving wheel of a locomotive, a safe maximum has probably been reached. Close examination of the steel rails where engines having this enormous weight on the drivers are running, indicates that the limit of economy has been passed.

Foreign Markets.

EQUIVALENTS.

	Cents.
Franc, Peseta or Lira.....	19.3
Florin (Netherlands).....	10.2
Florin (Austria).....	35.9
Milreis (Portugal).....	\$1.08
Milreis (Brazil).....	54.6
Mark (Germany).....	23.8
	Pounds.
Kilogram.....	2.205
Picul.....	134.

CHILI.

VALPARAISO, May 25, 1888.—*Copper*.—Up to the 14th inst. \$30 $\frac{1}{2}$ quintal was still paid, but on lower cable news a decline subsequently took place to \$24.80, dealings aggregating 10,785 quintals, the latter price with 27/6 freight per steamer, equaling £71. 18/8. *Nitrate*.—The demand both for Europe and the United States abated somewhat during the fortnight, transactions being limited to some shipments per steamer. Holders have meantime remained quite stiff at \$2.72 $\frac{1}{2}$ @ \$2.75 for 95 %, which equals, with 28/9 freight, 8/31 $\frac{1}{2}$ cwt., there being a scarcity of 96 % Nitrate, \$2.90 is asked for the same. Sales sum up only 84,500 quintals. Charters have amounted to 19,800 tons for Europe. There were shipped since January 1:

	1888.	1887.	1886.
Quintals.	Quintals.	Quintals.	Quintals.
To the North of Europe.....	3,372,327	2,392,801	1,619,139
To the Mediterranean.....	41,916	102,136	57,298
To the United States on the Atlantic.....	661,042	688,375	422,437
To the United States on the Pacific.....	67,500	118,296	82,113

Total..... 4,142,785 3,301,608 2,180,987

Coal has been sustained: We quote Newcastle, February shipment, 55/; March, 49/; April, 43/6 @ 44/6; May, 37/6, and June, 36/; Australian, August, 33/. *Exchange*, 90 days' sight, 25 $\frac{1}{2}$ d.—*Weber & Co.*

WEST INDIES.

PORT OF SPAIN, TRINIDAD, June 22, 1888.—*Asphaltum*.—A moderate demand has prevailed since my last reports, at well-sustained figures. I quote to-day, f.o.b., including export duty: Balled, $\frac{1}{2}$ ton, \$14.04, and Crude, \$6.84. There have been shipped altogether since January 1, 26,081 tons, against 16,412 last year, and 14,696 in 1886. *Exchange*, 90 days' sight, \$4.74 @ \$4.80.—*E. P. Masson.*

SOUTH AFRICA.

PRETORIA, June 11, 1888.—*Gold*.—The May gold production of the Witwatersrand gold fields has been 19,002 ounces, as compared with 15,853 in April; 14,706 in March; 12,161 in February, and 11,299 in January, constituting a total in five months of 72,991 ounces, and demonstrating the rapidly rising importance as a gold producer of the district named.—*Tremvaal Mining Argus.*

EAST INDIES.

COLOMBO, June 14, 1888.—*Plumbago*.—Our market has been moderately active and steady. We quote in rupees $\frac{1}{2}$ ton: Large Lumps, 145 @ 160; Ordinary ditto, 125 @ 150; Chips, 80 @ 95, and Dust, 40 @ 65. Shipments since October 1 have been as follows: To England, 53,862 cwt.; to Marseilles, 38; to Trieste, 419; to Hamburg, 6955; to Antwerp, 3189; to Bremen, 1012; to India, 82, and to the United States, 98,914—altogether, 164,471, against 172,413 in 1887; 133,564 in 1886, and 127,003 in 1885. *Coir Yarn*, Nos. 1 to 4 may be quoted 7 to 12 rupees $\frac{1}{2}$ cwt. *Exchange*, six months' 1/4 7-16.—*Volkart Brothers.*

PENANG, June 9, 1888.—*Tin*.—While the demand for Europe and America has ceased altogether, China, on the contrary, has taken 6500 piculs. There was a decline from \$34.75 $\frac{1}{2}$ picul to \$34.10, followed by a recovery to \$34.60, winding up to-day at \$34.50. Receipts for the fortnight summed up 7500 piculs, and there are only left unsold in bazaar 50 tons. Some of the shipments to China were made for smelters' account. During the first five months shipments from here have summed up 76,072 piculs to England, against 63,571 same time last year; to the Continent, 338, against 815, and to the United States 485, against 9682. *Gum Benjamin* may be quoted: No. 1, \$34 @ \$39 $\frac{1}{2}$ picul, and No. 2 \$30 @ \$50; prime *Gutta Percha*, \$60 @ \$100, and *India Rubber*, \$70 @ \$75. *Exchange*.—Four months' bank, London, 3/0 $\frac{1}{2}$.—*Schmidt, Kustermann & Co.*

SINGAPORE, June 2, 1888.—*Silver Coin*.—A strong movement is on foot to induce the home government to coin a British Silver dollar to

circulate in the Straits Settlements and Hong-Kong in the place of the Mexican dollar; the latter, though it has full weight, wears off rapidly, is rough-looking, and entails a dependence on Mexico frequently of an annoying kind. Since the failure of the Hong-Kong mint all agree that it would be useless to try to prevail on the home Government to make another experiment of the kind and create a Colonial mint, but it may not object to the British mint coining such dollars of the fineness and weight of the Mexican for circulation here, at Hong-Kong and China. While the Hong-Kong Chamber of Commerce is ready to support the project, the Hong-Kong Colonial Government declines to favor it, because in its opinion the British dollar cannot be produced as cheaply as the Mexican. Yet France and Spain have taken steps to coin dollars for their East India colonies.—*Straits Times.*

MANILA, July 16, 1888.—*Hemp*.—Has been steady during the week at \$8.62 $\frac{1}{2}$ $\frac{1}{2}$ picul as compared with \$7.75 last year. These quotations equal $\frac{1}{2}$ ton, cost and freight, £28. 12/6, against £26. 14/4; cleared for the United States, since last cable, 2000 bales, against none; ditto since January 1, 99,000 bales, against 123,000; loading for ditto none, against 13,000; cleared for England since January 1, 186,000, against 112,000; loading for ditto 22,000, against 23,000; cleared for all other countries, 42,000, against 22,000; receipts at all ports since last cable, 9000, against 8000; since January 1, 323,000, against 250,000 in 1887, and 200,000 in 1886. *Freight*, \$5.50, against \$5. *Exchange*, 3/5 $\frac{1}{2}$, against 3/5 $\frac{1}{2}$.—*Ker & Co. to Charles Nordhaus, New York, per cable direct.*

CALCUTTA, July 9, 1888.—*Jute*.—The market has remained steady during the week. In new crop Jute a steady, moderate business is being transacted daily, the bulk being for shipment via canal in August and September, either to London or Dundee. The amount shipped to the latter is considerably less than the previous months; it seems that the higher prices cause this falling-off. There is for the present little prospect that prices will drop all of a sudden, hence our balers are by no means anxious sellers. The first receipts of new are likely to be bought up by the East India spinners. These will stand in need of a supply in August. As at the same time bales sold extensively, August delivery of new Jute, there is going to be a sharp competition, which will not favor a decline during that month. The old crop supplies being exhausted on all hands, all consumers are eager to get the new jute; indeed, everything seems to point rather to higher than lower prices at the opening of the campaign. Week's sales, 50,000 bales at 24 $\frac{1}{2}$ @ 27 $\frac{1}{2}$ rupees. Now balers ask more, and in a few instances have got it. Many orders from abroad have remained unexecuted. The weather is all that can be wished for to propitiate the new crop. Rains have been general without being too heavy anywhere.—*Times of India.*

SINGAPORE, July 15, 1888.—*Tin*.—Exports from here and Penang to the United States during the fore half of the present month have amounted to 150 tons, against 100 last year; to England, 200, against 500. Since January 1 they were respectively 1000, against 2700, and 19,200, against 7100.—*Giffillan, Wood & Co. to Charles Nordhaus, New York, per cable direct.*

SPAIN.

BILBAO, July 7, 1888.—*Iron Ore*.—Business has been resumed by the purchase of several single cargoes at 7/6 @ 8/ for Campinil, and 6/10 @ 7/3 Rubios. Since February, the demand for our Ores has fallen off considerably, some 400,000 tons. Since January 1 there have been shipped 1,965,633 tons, against same time last year 2,350,805. *Pig Iron*.—For export, 3875 tons were shipped during the week, and coastwise 1096. The spot price of the latter is 57 @ 60 pesetas f.o.b. here $\frac{1}{2}$ ton, and futures are worth 55 @ 58; "Lingotillo" at Huelva or Seville, 65, all quotation of the "Vizcaya Company."—*Bilbao Marítimo y Comercial.*

SWEDEN.

STOCKHOLM, July 12, 1888.—*Iron*.—The Government will not yet allow the new duty of 80 oere $\frac{1}{2}$ 100 kg. on Pig Iron (about 1 $\frac{1}{2}$ $\frac{1}{2}$ American), to become operative, because for the time being it will afford no protection whatever to Swedish blast furnaces, but on the contrary would prove unwelcome to machine shops and foundries, so long as these remain unprotected by reason of the Franco-Swedish treaty of commerce. Should France consent to a modification of the latter, the way would be smoothed for a protection of Swedish Iron industry, and Parliament may then act accordingly.—*Dagbladet.*

GERMANY.

HAMBURG, July 14, 1888.—*Iron*.—Business revives slowly in Rhenish-Westphalia from the interruption it suffered during stock-taking. There has been less of an export demand for

Spiegel ever since May, when it was active. Domestic consumers continue taking the same steadily. The fact is that in consequence of dear raw material competition abroad has become difficult. Siegen quotes 10 to 12 $\frac{1}{2}$ 57. The quotation there for prime Forge Pig is 48 @ 49, at Siegen, and 50 @ 52 elsewhere; Luxembourg, 38.70 marks; all $\frac{1}{2}$ ton. English Bessemer is steady at 42/6. Finished Iron is quiet; the rolling mills have booked orders to last them for a couple of months. The domestic demand for Hoop Iron has improved, but it does not suffice, hence sacrifices have to be made to get rid of the excess on hand by consigning it abroad. Thin Sheets are dull still. Wire Rods have been placed more readily at home, but the American demand is slack still. Machine shops and foundries continue doing tolerably well. Car works are very busy. *Lead*.—At a general meeting of Spanish, German, English and French lead producers, recently held at Paris, the question was discussed most thoroughly what could be done to place the European Lead markets permanently, if possible, on a sounder basis. A committee of three was appointed to submit to another general meeting soon to come off a series of resolutions to be elaborated by the same. The committee was ordered to study particularly whether there is an approximate equilibrium between production and consumption; if it should be found that there is an excess of production, the committee is to suggest to what extent the latter ought to be curtailed. Finally, the meeting gave it as its opinion that the sale of European Lead should be concentrated in one hand in the future. *Sewing Machines*.—Manufacturers of and dealers in Sewing Machines in Germany have petitioned Parliament to raise the duty from 3 marks $\frac{1}{2}$ 100 kg., to 60 marks on the machines and 15 marks on the stands; the import was 18,435 metrical cwt. of 100 kg. in 1887, against 25,354 in 1886, and 26,848 in 1885; the amounts from the United States having been respectively 16,935, 21,840 and 24,358; and from Austria, 1864, 1844, and 1386. The export of German Sewing Machines was on the other hand 64,237 cwt. in 1885, 67,758 in 1886, and 73,473 in 1887. The impression at Hamburg is that under the circumstances it would have been wiser to let the subject rest where it is.—*Borsenhalle.*

The Vestibule Law Suits.—In the United States Circuit Court at Chicago two weeks ago, Judge Gresham and Blodgett granted the motion of the Wagner Palace Car Company to modify the preliminary injunction issued last month in the vestibule car case between the Wagner and the Pullman companies. The effect of the decision is that the injunction is dissolved, and the Wagner Company is at liberty to use the vestibule platform as originally constructed. By this action all proceedings in the litigation are stopped until the matter can come up for trial in the regular way, which will probably not be for over a year. In the meantime the Wagner Company give bonds.

The North Chicago Rolling Mill Company started up part of their Bay View Works at Milwaukee, Wis., on the 19th inst., having signed the scale. In reply to inquiries they state that for some time they will not run their puddling furnaces on metal direct from the blast furnace, as they have an accumulation of pig iron on hand which will first be disposed of. The resumption of direct puddling will depend upon the condition of trade, as the pig iron in stock may last for several months if the demand for finished iron is not more active. When it is cleaned up direct metal will again be used, as the results obtained with it in the first half of the year were very satisfactory.

The Postmaster-General has received official notice that the South American Steamship Company of Chili have been subsidized by the Chilean Government to establish a fortnightly service between Valparaiso and the Isthmus of Panama, to connect with the Pacific Mail Steamship Company to and from New York. The fleet of the South American Steamship Company consists of 18 large steamships, which are commanded principally by Americans. The subsidy is \$250,000 per annum.

TRADE REPORT.

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St.,
PHILADELPHIA, Pa., July 24, 1888.

The general tone of the market seems to have improved during the past week, although upon a careful investigation Pig Iron appears to be the only article that shows genuine strength. This is probably due to the resumption of work at mills in the West, as most of them had cleaned up their stocks in anticipation of a more or less protracted lockout, and as they are now starting up they all require material to go on with, hence the active demand. It is not clear, however, that this signifies that the turning point in the market has been reached. Finished Iron is not as firm as it was two or three weeks ago, and, paradoxical as it may seem, for the same reason that Pig Iron is firmer. Pig Iron weakened on prospect of decreased consumption while Finished Iron strengthened on prospects of a decreased production, so that now the position is again reversed. Of course it is quite possible that a firmer and more active market may be developed along the entire line—we are rather inclined to believe that this will be the case—but as yet there are no positive indications of such an event, so that in the meantime it is all a matter of opinion.

Pig Iron.—As already stated, the market is firmer. A great deal of Iron has been bought during the past couple of weeks, and a continuance of the demand on a similar scale, and for a similar time, would probably lead to higher prices. The probabilities are, however, that the most needy buyers have covered their requirements for the next 30 or 60 days, and that the demand for some time will be of the usual routine character. Meanwhile large consumers are likely to watch the market closely, and if the indications point to a larger consumption than was met with during the first half of the year orders will be pretty sure to come in at a rate that will start prices on the way to a somewhat higher level. As far as we can learn the chances of an increased production are not very strong, as there is no money in the business at present prices. Three or four new furnaces in the South may be "blown in" some time before the middle of September, but they are not likely to exercise any material influence on the market, unless consumption proves to be smaller than the trade anticipates. Taking the market as a whole, there appears to be a possibility of somewhat higher prices as the season advances, while there is no probability of a movement in the opposite direction. This we believe fairly represents the feeling of the trade today, and is apparently fully warranted by recent developments. The excitement and uncertainty attending a Presidential election are not favorable for any very pronounced changes, but, when that question is finally settled every one expects a more active business. Prices of Pig Iron tide-water delivery may be quoted firm at the following prices, say: No. 1 Foundry, \$18 @ \$19; No. 2, do., \$17 @ \$17.50; Gray Forge, \$15.75 @ \$16. Southern Irons are not offered here to any extent, but could probably be bought ex-ship at \$1 below Pennsylvania or Western makes, but they are not sought for, unless at low figures. A 2000-ton lot of Tennessee Iron was sold for Pipe making at something less than \$14.50, but the transaction was somewhat exceptional in its terms, &c.

Foreign Iron.—Prices are entirely nominal, as there is no demand, and no inquiries likely to lead to business at present. Asking prices are as follows:

Bessemer, \$19 @ \$20, c.i.f., duty paid, and 20 % Spiegel, \$26 @ \$26.50.

Blooms.—Business is rather quiet, but Steel moves fairly in small lots. Prices about as follows: Slabs and Billets from \$29 to \$35, f.o.b. cars at mill, according to analysis; Charcoal Blooms, \$52 @ \$54; Run-out Anthracite \$42 @ \$44; Scrap Blooms, \$34 @ \$35 per "bloom" ton of 2464 lb. Foreign at tide, c.i.f., duty paid, \$29 @ \$30 for Nail Slabs; \$31.50 @ \$32.50 for 4 x 4 Billets, and \$35 @ \$39 for Siemens-Martin, price according to analysis, &c.

Muck Bars.—The demand is improving, and sellers find the market about 50¢ per ton in their favor. Sales during the week have been made at \$27 @ \$27.50, delivered, with a general disposition to hold for the outside figures.

Bar Iron.—There is a somewhat heavier demand, but it is more than offset by the increased number of sellers. Prices are, therefore, more uneven than they have been for several weeks past, which in the majority of cases means lower prices. Mills are busy and can run two or three weeks on such orders as they have on their books, but beyond that there is some anxiety to secure new business. Competition is closer than ever, and the worst of it is that those making strictly first-class Bars have to bid against some who use a mixture of old rails and other cheap material. In one instance we hear of what was claimed to be a first-class quality of Bars offered at less than 1.7¢, delivered, but it is doubtful if anything strictly up to requirements could be had for less than 1.8¢, although some people seem to be willing to run the risks of a guarantee, even if what they furnish is not up to the standard. For this reason it is almost impossible to quote prices correctly, because, while 1.8¢ @ 1.85¢ is the usual quotation, some offer large lots at a great deal less. Skelp Iron is also a shade lower, although there is a better demand, and some good-sized lots have been taken at from 1.75¢ to 1.8¢ delivered.

Plate and Tank Iron.—The demand is fairly active and mills are nearly all busy for the present. Orders for fall delivery, however, could be readily placed at the low rates quoted some time ago, although for small lots early delivery prices are well up to the asking rate. The outlook is not specially discouraging, although for the present there is very little in sight beyond the ordinary routine demand. Asking prices about as follows: Ordinary Plate and Tank Iron, 1.95¢ @ 2.05¢; Shell, 2.4¢ @ 2.5¢; Flange, 3.5¢; Fire-Box, 4¢; Steel Plates, Tank and Ship Plate, 2.3¢ @ 2.4¢; Shell, 2.7¢; Flange, 3¢ @ 3½¢; Fire-Box, 3½¢ @ 4½¢.

Structural Iron.—A good demand for small lots is reported and the mills are kept fairly employed on this class of business. The outlook is not particularly bright, but manufacturers express themselves somewhat hopeful of the fall trade, although with such a large capacity it will require a heavy demand to keep all the mills busy. Prices are unchanged, although it is said that Angles are steadier than they were some time ago. Quotations about as follows: 2¢ @ 2.10¢ for Bridge Plate; 2¢ @ 2.10¢ for Angles; 2.6¢ @ 2.7¢ for Tees, and 3.3¢ for Beams and Channels, Iron or Steel.

Sheet Iron.—A moderate amount of business is reported and at steady prices for the best makes, but there is a good deal of inferior stuff offered at low figures. Standard makes are quoted as follows for small lots:

Best Refined, Nos. 26, 27 and 28....3½¢ @ 3½¢
Best Refined, Nos. 18 to 25.....3 @ 3½¢
Common, ½¢ less than the above.
Best Bloom Sheets, Nos. 26 to 28....4½¢ @ 4½¢
Best Bloom Sheets, Nos. 22 to 25....4 @ 4½¢
Best Bloom Sheets, Nos. 16 to 21....3½¢ @ 3½¢

Blue Annealed.....2.8 @ 3 ¢
Best Bloom, Galvanized, discount.....62½ ¢
Common, discount.....67½ ¢

Merchant Steel.—Fine Tool Steel has been in good demand during the past week, and several large sales have been made, while for cheap Steels there has been considerable inquiry, but very little in the way of immediate business. Prices for lots from store are quoted as follows: Tool Steel, 8½¢; Machinery, 2½¢; Crucible Spring, 4½¢; Open-Hearth Ordinary Spring, 2½¢ @ 2½¢; Crucible Machinery, 5¢; Best Sheet Steel, 10¢; Ordinary Sheet, 8¢.

Steel Rails.—There is very little doing, and at \$30 only small lots are taken. Mills in this vicinity claim that it would require to be a very desirable order to secure attention at a very low figure, although it is believed that several orders have been taken at less money by mills in the West. Still \$30 at mill is the usual asking price for the present.

Old Rails.—The few lots that are here are held above the market, say \$21.50 @ \$22 in store. Buyers for small lots could be found at about \$21, f.o.b. cars, but sales are chiefly at about \$21.50 @ \$22 delivered at mills in the interior.

Scrap Iron.—Market very dull, and prices feverish and irregular. Small lots of good quality command about the figures quoted a week ago, but the market will not bear much pressure: \$18 @ \$19 for cargo lots; \$20 @ \$21 for carload lots, delivered, or for choice \$21.50 @ \$22; No. 2 do., \$14 @ \$15; Turnings, \$13 @ \$14; Old Steel Rails, \$19 @ \$20; Cast Scrap, \$14 @ \$15; do. Borings, \$9 @ \$10; Old Fish Plates, \$24 @ \$25. Old Car-Wheels, \$17 @ \$18, Philadelphia, or its equivalent.

Wrought-Iron Pipe.—Contrary to all expectations the improving condition of trade in this department noted last week continues, and manufacturers feel confident of a fair business from this time on. Discounts are quoted as follows: Black Butt-Welded 55 ¢; on Galvanized do., 45 ¢; on Black Lap-Welded, 65 ¢; on Galvanized do., 52½ ¢; on Boiler Tubes 60 ¢.

Nails.—Trade is hesitating and there is absolutely nothing of interest to note. The small amount of business being transacted consists principally of small orders for city delivery. Price is nominally \$2.05 from store, with the usual discount for carload lots.

Chicago.

Office of *The Iron Age*, 95 and 97 Washington St.,
CHICAGO, July 23, 1888.

Pig Iron.—An increased volume of business is reported, but trade cannot yet be called active. The inquiries received cover a very large quantity in the aggregate, and if but half of them were to be placed, the complexion of the market would undergo a decided change. An attempt is being made to push prices up a trifle, but the effect is generally to turn buyers to brands which are still to be had at old prices. Both buyers and sellers are very conservative. The former are slow to make contracts ahead for any considerable time, and the latter insist that they prefer to sell only for reasonably easy delivery at present prices. The market is in a very sensitive condition just now and ready to respond to a decided influence in either direction. If the large purchases usually made at this time of the year should be speedily completed, the situation will be greatly improved for the furnace companies, and they will be able to maintain prices for the fall trade. Cash quotations are as follows, f.o.b. Chicago: Lake Superior Charcoal, all numbers, \$19 @ \$19.50; Alabama Car-Wheel, \$26.25;

Southern Charcoal Foundry, No. 1, \$18 @ \$19; Jackson County Softeners, No. 1, \$17.50 @ \$18; Hocking Valley, Soft Foundry, No. 1, \$16.50 @ \$17.50; American Scotch (Blackband) No. 1, \$18.25 @ \$19; other Ohio Scotch Irons, No. 1, \$17.50 @ \$18; Lake Superior Coke, No. 1, \$17 @ \$17.50; No. 2, \$16 @ \$16.50; No. 3, \$15 @ \$15.50; Southern Coke, No. 2, \$16.50 @ \$17; No. 2½ and Open Bright, \$16; No. 3, \$15.50; No. 1 Mill, \$15 @ \$15.50.

Bar Iron.—Opportunities are now offered by the Agricultural Implement trade for the sale of large quantities of Bar Iron, but agents are considerably hampered by the backwardness of their mills to get into good working trim, or by the indifference with which they regard contracts for very long delivery at present prices. The general demand is not very heavy, and competition is quite strong for the orders for early delivery now coming forward. Common Iron is still quoted from mill at 1.65¢, half extras, f.o.b. Chicago, but this can be shaded on some sizes. The stores report a very steady demand from small consumers at 1.90¢ @ 2¢.

Structural Iron.—The country demand for Beams is now better than the city trade, as building seems to be much more active in the outlying towns. Some good orders have been placed for Bridge work. Store prices range from 2.40¢ to 2.70¢ for Angles; 2.60¢ to 2.90¢ for Tees; 3.80¢ for Beams and Channels. From mill Angles are quoted, f.o.b. Chicago, at 2.20¢; Universal Plates, 2.25¢; Tees, 2.45¢; Beams, 3.40¢.

Plates, Tubes, &c.—The general demand for Plates has been very good, and plenty of orders are still in sight. Bids have been solicited for 1500 tons of Tank Steel for the West Side cable road. From store prices are as follows: Heavy Sheets, Nos. 10 to 14, 2.65¢; Tank Iron, 2.55¢; Tank Steel, 2.80¢; Shell Iron, 3¢; Shell Steel, 3.25¢; Flange Iron and Steel, 4¢; Fire-Box Steel, 4.75¢ @ 5.75¢; Boiler Rivets, 4¢ @ 4.25¢; Ulster Iron, 3.75¢; Boiler Tubes, 60 % and 10 % off on 2½-inch and larger and 62½ % off on 2-inch and smaller.

Sheet Iron.—No. 27 Common Black is still quoted at 2.95¢, f.o.b. Chicago, in carload lots, but inquiries have not been so numerous the past week, although it is believed that a considerable percentage of the larger buyers have not yet contracted for their season's supply. Jobbers are quoting 3.10¢ @ 3.20¢ from store, according to quantity, for No. 27, but this has been shaded under special circumstances.

Galvanized Iron.—Manufacturers' agents report a slight hardening of prices under the continued good demand, but the jobbers are now less firm, as they are receiving stocks bought at concessions some time since. Quotations for small lots are nominally 60 % and 5 % off for Juniata, and 60 % and 10 % off for Charcoal.

Merchant Steel.—Some Plow manufacturers have begun to place orders for Syndicate Steel, but they strongly protest against the rate of 7½¢ @ 9¢ lb, f.o.b. Pittsburgh, which they insist is too high. The demand from the general trade has been light for several days. Quotations from store are as follows: Bessemer Bars, 2.30¢ @ 2.50¢; Tool Steel, 8½¢ @ 9½¢; Specials, 13¢ @ 25¢; Crucible Spring, 4.40¢; Open-Hearth Spring, 2.90¢; Open-Hearth Machinery, 2.75¢ @ 3¢; Crucible Sheet Steel, 7¢ @ 11¢.

Steel Rails.—The condition of this branch of trade shows no change, manufacturers anxiously awaiting a turn in the tide. Only small orders are being received, ranging from a few carloads to a few hundred tons, on which prices still range from \$32 to \$32.50.

Old Rails and Wheels.—Old Iron Rails are reported higher. A sale of 200 tons was made early in the week at \$18.50, but later \$19 was refused, railroad companies insisting that they were worth from \$19.25 to \$19.50. Old Car-Wheels are very quiet. They are probably worth about \$18.50.

Scrap.—The supply is very abundant, but sellers are not so weak as they were, anticipating an early demand from the rolling mills now starting into operation again. An exception is found in the lowest grades of Scrap, which are to be had at slightly easier prices. Some sales of Wrought are reported, but the quantity was not large. Mixed Country Scrap is now quoted at \$11 @ \$11.50. Selling quotations for carefully selected are as follows, per ton of 2000 lb: No. 1 Forge, or Railroad Shop, \$17 @ \$18; Track, \$16.50; No. 1 Mill, \$13; Light Wrought, \$9; Horseshoes, \$16.50; Axles, \$22; Cast Machinery, \$12.50 @ \$13; Stove Plate, \$9; Cast Borings, \$8.25; Wrought Turnings, \$10; Axle Turnings, \$12; Coil Steel, \$13.50; Leaf Steel, \$14.50; Locomotive Tires, \$15.

Hardware.—The demand for Shelf Hardware is unusually good for this time of the year. It very seldom happens that night work is necessary to dispose of a rush of orders in midsummer, yet that has recently been the experience of some of the leading houses in this city. While the demand is of a general character, all classes of goods moving very freely, an especially heavy trade is noted in Grain Cradles, caused by the difficulty encountered in using machinery in fields of grain beaten down by the severe storms. Carriage Bolts have now settled down to 75 ¢ off, but no other changes in prices worthy of notice have been made. Collections are always light in the harvest season, but they are fully up to expectations. Heavy Hardware is moving a little more slowly, but a good demand is experienced from manufacturing consumers.

Nails.—Manufacturers' agents have made some good sales of Steel Nails to parties who believe they are a good purchase at the terms, although the consumption is very light at present and the demand does not warrant the laying in of large stocks. The price of large lots from factory is now quoted at \$1.90 @ \$1.92½, f.o.b. Chicago, but special terms are made on almost every sale, according to specifications, &c. Jobbers' quotations are \$2.05 for small lots of Steel Nails, and \$2.50 @ \$2.60 for Wire Nails, but prices are weak under the slow demand and concessions are made when necessary.

Barb Wire.—The demand is very light. Manufacturers are piling up Wire in their warehouses and many of them are preparing to shut down on the 1st of August for repairs, the dullness of the trade being a strong inducement to the suspension of operations for a longer period than usual.

Pig Lead.—Quite a healthy consumptive demand is noted in this market. Sales reported for the week aggregate 700 tons at prices ranging between 3.80¢ and 3.85¢, closing with a feeling of slight weakness resulting from lower prices in Eastern markets.

Copper.—Buyers display much timidity in making contracts involving any considerable quantity of material, evidently fearing a collapse in prices by the culmination of the foreign speculative syndicate's plans. Negotiations of importance are pending, but prices are firmly maintained at former rates.

Chattanooga.

Office of *The Iron Age*, Carter and 9th Sts.,
CHATTANOOGA, July 23, 1888.

The prospect of good crops throughout our entire South was never better at this season of the year. Many of them are be-

yond any probable contingency. Should cotton bear out indications this year will be another one added to prosperous years of the South. Neither have the manufacturing interests anything to complain of. None of those that have been started on any thing like a sound basis have shown any backward movement, but, on the contrary, have been gaining in financial strength and in many cases have added largely to their capacity.

Pig Iron.—The status of the market of this article appears to remain about the same as last reported, and the general expression appears to indicate that there is a feeling that prices will go no lower. Among some large consumers there appears to be a desire to make contracts to extend through the balance of the year, but which most of the furnaces are disinclined to do. There has been no disposition on the part of buyers to ask for lower figures. They appear to be satisfied if they can purchase round lots at present prices. There is still a perceptible scarcity of good Foundry grades, and some of the stacks are not quoting to new customers, as their make is wholly absorbed by those who have been taking their output regularly. Foundries through the South are gradually increasing their consumption, which is getting to be a matter of considerable importance to some of the stacks that have been giving this market their special attention. Forge grades may be said to be in better demand, and for the past week or ten days there has been quite a spirited movement of these Irons. Upon the whole the outlook is a little improved since the last report.

Cleveland.

CLEVELAND, July 23, 1888.

Iron Ore.—All dealers in Bessemer Ores report the season's output nearly disposed of. Prices have slightly strengthened, a 50,000-ton lot of Menominee Bessemer having been sold during the week at \$5, whereas the same Ore could have been bought three weeks ago for \$4.75. The very best grades of Ore did not maintain their fixed prices, sales having been made at \$5.75 for the most valuable Ores obtainable. Lake freights have also advanced, the rate from Ashland being \$1.25; from Marquette, \$1.15, and from Escanaba, 90¢. These changes are incidental to the close of every season's sales. Bessemer Hematites seem to have sold more freely than any other grade of Ore, dealers being quite unable to supply present demands. Gogebic Bessemer have sold with so much freedom during the past two weeks that there are really but small lots left for sale. The season's shipments from upper lake ports slightly exceed 1,525,000 tons, against 1,750,000 tons up to a corresponding period last year.

Pig Iron.—Buyers are purchasing liberally. Transact ons embrace considerable Iron for future delivery in round lots. Charcoal Irons have been in especial good demand during the past week. The inquiry for Bessemer Iron has been active and prices have been fully maintained. The following quotations are reported today:

No. 1 to 6 Lake Superior Charcoal.....	\$20.50 @ \$21.50
No. 1 Strong Foundry, Bessemer quality, per ton.....	17.25 @ 18.25
No. 1 Strong Foundry, per ton.....	17.00 @ 17.75
No. 2 Strong Foundry, per ton.....	16.00 @ 17.00
No. 1 American Scotch, per ton.....	17.50 @ 18.00
No. 2 American Scotch, per ton.....	16.50 @ 17.00
No. 1 Soft Silvery, per ton.....	17.50 @ 18.50
Mahoning and Shenango Valley Neutral Mill Irons, per ton.....	@ 14.75
Mahoning and Shenango Valley Red Short Mills, per ton.....	@ 15.25

Old Rails.—The sale of a small lot of Old Americans at \$21.50 constitutes the week's business. Old Wheels are quoted nominally at \$19.50, and there is still a demand for Selected Axles.

Nails.—Steel Wire Nails at \$2.60 are still selling freely. Iron Nails are quoted at \$1.90, and Steel Nails at \$2.

Coke.—Heavy sales have been made during the past week at the rate of \$1 per ton at the ovens.

Cincinnati.

CINCINNATI, July 23, 1888.

Pig Iron.—There has been a more urgent demand for both Mill and Foundry grades, especially for long forward deliveries, but there has also been more buying for the near months. Furnaces, while indisposed to sell except at an advance, have taken some orders of moment at last week's figure, the deliveries of which embrace the rest of the current year. Rolling mills, now that they have settled their strife with the Ironworkers, have been in the market for large amounts, and there have been sales here of between 10,000 and 15,000 tons of Forge Iron. Stocks of Iron have continued to decline, and upon this both sellers and buyers base their opinions of improvement in the future. The new furnace blowing in, in the South, will probably increase the general output, as compared with the consumption, but little. The off grades of Mill Iron have been well cleaned up, and the market has improved correspondingly; in fact, the market for Mill Iron is now relatively in its normal condition. While the aggregate volume of business has continued to increase the individual sales have not been large. No. 2 Southern Coke Foundry Iron has sold at \$15.50, and at the close furnaces are not ready sellers under \$16; No. 24 Foundry has been sold at \$15 @ \$15.25. No. 2 Mill has been sold on the basis of \$18.50, and No. 1 at \$14.25, and there have been a few transactions within 25¢ of this rate. One thousand tons of Lake Superior Car-Wheel Iron sold at about \$20.50 here. Prices current here, cash, f.o.b., are approximately as follows:

Hot-Blast Foundry.

Southern Coke, No. 1.....	\$16.50 @	\$17.00
Southern Coke, No. 2.....	15.50 @	16.00
Southern Coke, No. 3.....	15.00 @	15.50
Ohio Soft Stone Coal, No. 1.....	17.00 @	17.50
Ohio Soft Stone Coal, No. 2.....	15.25 @	15.75
Mahoning and Shenango Valley.....	16.50 @	17.00
Hanging Rock Charcoal, No. 1.....	20.50 @	22.50
Hanging Rock Charcoal, No. 2.....	19.00 @	21.00
Tennessee and Alabama Charcoal, No. 1.....	17.50 @	18.00
Tennessee and Alabama Charcoal, No. 2.....	16.50 @	17.50

Forge.

Strong Neutral Coke.....	13.50 @	14.00
Mottled Neutral Coke.....	12.50 @	13.00
No. 1 Mill Coke.....	14.00 @	14.50
No. 2 Mill Coke.....	13.50 @	.....

Car-Wheel and Malleable Irons.

Southern Car-Wheel.....	20.00 @	23.00
Hanging Rock, Cold Blast.....	22.00 @	25.00
Lake Superior Car-Wheel and Malleable.....	20.50 @	21.50

Manufactured Iron.—The manufacturers' Association have practically withdrawn from the contest with the Amalgamated Association, and all those who have not signed the scale will probably do so during the present month, although several of the mills will hold out until the repairs have been fully completed. There has been a more active demand for manufactured Bar and Plate Iron at about rates current before the strike. Bar and Sheet Iron—Common Bar Iron, 1.90¢ @ 2¢; Charcoal Bar Iron, 2.90¢ @ 3¢; Sheet Iron, Boiled, Nos. 10 to 27, 2.50¢ @ 3.25¢; Sheet Iron, Charcoal, Nos. 15 to 25, 3.4¢ @ 4.4¢ per lb.

Nails.—There has continued to be a fair jobbing demand for both Iron and Steel Nails, and moderate sales have been made from the mills at about 15¢ under the quoted jobbing prices, which are based upon 12d @ 40d, which sell at \$2 per keg, with 10¢ rebate in carload lots at mills; 50d @ 60d, 25¢; 10d, 10¢; 8d @ 9d, 25¢; 6d @ 7d,

40¢; 4d @ 5d, 60¢; 3d, \$1, and 2d \$1.50 per keg more. Steel Nails sell at \$2 and Steel Wire Nails at \$2.65 @ \$2.75 per keg.

Old Material.—There has been but little change in the market, and moderate sales of Old Rails have been made at \$19.50 per ton and Old Wheels at \$18.50 per ton spot cash at Cincinnati, or equivalent to such rates.

Louisville.

LOUISVILLE, KY., July 23, 1888.

Pig Iron.—Sales of Iron in lots of from 300 to 500 tons continue to be made at prices current last week. There is a decided feeling on the part of nearly all the buyers that bottom has been reached, and though it is not expected that much of an advance will take place, prices will probably advance from 25¢ to 50¢ a ton, and it is thought a good time to buy. The disposition on the part of furnacemen not to sell for long delivery is increasing, and the more conservative furnaces are offering Iron only for from 60 to 90 days. Sales of Southern Iron have been made East by a Louisville house during the last week at prices fully 50¢ a ton higher than the same would bring in the Louisville market, and it is evident that prices must readjust themselves in the West, or else Iron will be shipped East in large quantities. We think it looks more favorable than at any time this year for large sales, and at prices better than those recently current.

Southern Coke, No. 1 Foundry.....	\$16.00 @	\$17.00
" " No. 2.....	15.00 @	16.00
" " No. 2 1/2.....	14.50 @	15.00
Hanging Rock Coke, No. 1 Foundry.....	16.50 @	17.00
Hanging Rock Charcoal, No. 1 Foundry.....	20.25 @	22.25
Southern Charcoal, No. 1 Foundry.....	17.25 @	17.75
Silver Gray, different grades.....	13.25 @	14.25
Southern Coke, No. 1 Mill, Neutral.....	12.75 @	13.75
" " No. 2.....	12.25 @	13.25
" " No. 1 " Cold Short.....	12.25 @	13.25
" " Charcoal, No. 1 Mill.....	13.25 @	14.75
White and Mottled, different grades.....	12.00 @	12.50
Southern Car-Wheel, standard brands.....	21.50 @	24.50
Southern Car-Wheel, other brands.....	18.50 @	20.50
Hanging Rock, Cold Blast.....	22.50 @	24.50
Hanging Rock, Warm Blast.....	18.50 @	19.50

Pittsburgh.

Office of The Iron Age, 77 Fourth Ave.,
PITTSBURGH, July 23, 1888.

While the Iron lockout is virtually over, there is a great deal of dissatisfaction manifested on the part of manufacturers generally; they consider that they are not being treated fairly by the Amalgamated Association, in having to pay more than Eastern manufacturers, with whom they have to compete. A number of Iron firms, both here and elsewhere, have not yet signed the scale, nor is it likely that they will until they are ready to start up their mills, in regard to which they do not appear to be in any especial hurry. In some respects, however, the outlook is favorable. Crop reports are generally encouraging. This, to some extent, will offset the discouraging effects of the political excitement of the Presidential campaign as well as the tariff agitation.

Pig Iron.—There has been a largely increased volume of business during the past week, consequent upon the starting up of a number of the mills, and the market, as might be expected, has stiffened up. Consumers, who two weeks ago would not think of buying, are now at least willing to talk on the subject; some of them have bought pretty freely already, and others are anxious to do so. They all made it a point to close down June 30 with as little stock as possible, and, being apprehensive of an advance, it is not strange that they are wanting to buy both for present and future delivery; moreover, there have been some sales on speculation, and it is evident that those of a speculative turn are of the opinion that prices will go higher, otherwise they would not buy. However,

there is not likely to be much of a boom, as there is nothing in the market for finished stuff to warrant it; even now it is claimed that the raw material is bringing all it is worth to consumers, when the price of Finished Iron is taken into consideration, and if this is the case no material advance in the former can reasonably be expected, although there are those who argue that it will go considerably higher, and that it will take Finished Iron up with it. Some of the sales reported show an advance of 25¢ per ton, and some furnacemen are refusing to make additional sales at rates now current. The sales reported during the week under review exceed 20,000 tons, the great proportion of it Gray Forge, chiefly at \$14.25, cash, with some few sales at \$14.40 @ \$14.50. Bessemer may be quoted at \$17.50 @ \$17.75, four months, with sales of several lots reported at \$17.25 @ \$17.30, cash. We quote prices as follows:

Neutral Gray Forge.....	\$14.00 @	\$14.75, 4 mos.
All Ore Mill.....	15.50 @	16.00, "
No. 1 Foundry.....	16.75 @	17.00, "
No. 2 Foundry.....	15.75 @	16.00, "
No. 3 Foundry.....	15.00 @	15.25, "
Charcoal Foundry.....	22.00 @	24.00, "
Cold Blast Charcoal.....	25.00 @	28.00, "
Bessemer.....	17.50 @	17.75, "

Muck Bar.—There is more doing, but prices remain unchanged. We can report a sale of 1000 tons at \$26, cash, and 750 tons at \$26.75, cash, the latter delivered at works of the buyer. The demand has improved considerably during the past week.

Manufactured Iron.—Now that the strike is virtually over, and the mills are resuming business, there is no longer any apprehension of a scarcity of stock, and the tone of the market, by reason of an increased production, is easier. Some firms have not yet signed the scale, and their mills are still standing idle, but all orders are now readily accepted, and buyers have no longer any apprehension about getting their wants promptly supplied, and that, too, within the range of our quotations. We continue to quote Bars at 1.70¢ @ 1.80¢; Plate Iron, 2.15¢ @ 2.20¢; No. 24 Sheet, 2.70¢ @ 2.80¢, all 60 days, with usual discount of 2 % off for cash.

Nails.—There is no improvement to note in the Cut-Nail trade. Demand continues light for the season and prices continue unsettled and unsatisfactory. Pittsburgh manufacturers are still holding for card rate, \$1.90, 60 days, 2 per cent. off for cash, in car lots, but they are getting very few orders. It is said that some manufacturers not very far west of Pittsburgh are selling at \$1.75 @ \$1.80; hence there is not much chance for the Pittsburgher unless he meets the price which he is refusing, claiming that it is better to do nothing than to work for nothing.

Wrought-Iron Pipe.—Buyers continue to have it pretty much their own way and manufacturers continue to report the market just about as mean as it can be. There is nothing like the business there was a year ago, but there is a possibility that the fall trade may pan out better than most people expect, as there is often a change for the better unexpectedly. That there is so little doing is accounted for by the fact that natural gas and oil development is very light as compared with what it was a year ago, while the capacity for making Iron Pipe has been considerably increased, several new mills having been completed within that time. It is impossible to quote prices as long as the market remains in its present go-as-you-please condition—every fellow for himself. Some manufacturers are indifferent about getting business, claiming that there is nothing in it at ruling prices.

Old Rails.—There has been very little business the past week, but, with the mills starting up, an increased demand is

looked for. A sale was reported two weeks ago at \$20.75, and there are buyers now at \$20.50, cash, but no sellers. It is doubtful whether a seller for American Tees could be found under \$21, as the supply is small and there are but few offering. The railroads centering here have but few for sale, and the same appears to be the case elsewhere.

Steel Rails.—Are still quoted at \$31 @ \$31.50, cash, delivered on cars at mill here, but it is intimated that for a desirable order the inside quotation would be shaded. The Edgar Thomson Works are busy, working up well to full capacity, but it is chiefly on orders booked some time ago.

Billets, &c.—There is a continued fair demand for Bessemer Steel Billets, which we continue to quote at \$28 @ \$28.50, cash, as to size, quality, delivery, &c. Nail Slabs remain unchanged at \$27.75 @ \$28, with but little inquiry. Sale 500 tons Domestic Bloom Ends at \$17.50, cash, and 250 tons Domestic Crops at \$17.25.

Railway Track Supplies.—Trade continues light, while prices remain about as last quoted: Spikes, \$2 @ \$2.10, 30 days, delivered; Splice Bars, 1.75¢ @ 1.85¢; Track Bolts, 2.85¢ with square, and 2.95¢ with hexagon nuts. It may be that a desirable order would be placed below our quotations.

Merchant Steel.—There is no improvement in the demand and no change in prices. Best brands of Tool Steel, 8½¢; Crucible Spring Steel, 4½¢; Crucible Machinery Steel, 5¢; Open-Hearth do., 2½¢.

Old Material.—We can report a sale of No. 1 (railway shop) Scrap, at \$19, net ton; Old Car Axles are quoted at \$23 @ \$24; Cast Scrap, \$15 @ \$15.50, gross; Cast Borings, \$11.50 @ \$12; sales 200 tons Scrap Steel, at \$17.

New York.

Office of *The Iron Age*, 66 and 68 Duane street, New York, July 26, 1888.

American Pig.—There is little change to be noticed in the Pig-Iron market, which continues very dull with no new business offering. It is remarked, however, that those who purchased early in the year for future delivery are taking Iron more freely now than heretofore. This delayed delivery of Foundry Pig is due to the fact that the foundries have been using considerable quantities of Southern Iron and have consequently put off delivery of Northern brands. The Lehigh furnaces are carrying very heavy stocks, but there is no weakening in price. Southern Iron may be quoted \$17.50 @ \$18 for No. 1, and \$16 for No. 2, delivered in New York. We quote standard and choice Northern Irons, tide-water delivery, as follows: \$18 @ \$18.50 for No. 1 Foundry, \$16.50 @ \$17.50 for No. 2 Foundry and \$14.75 @ \$16 for Gray Forge.

Scotch Iron.—The Scotch-Pig market is quiet and dull, and the slight advance in Glasgow is not felt here. We quote: Coltness, \$19.50 @ \$19.75; Summerlee, \$19.25 @ \$19.50; Langloan, \$19 @ \$19.50, and Dalmellington, \$18 @ \$18.50 for large to small lots.

Bar Iron.—The volume of trade is slightly improved, quotations for carload lots, half extras, on dock, being 1.60¢ @ 1.65¢ for Common Iron, 1.7¢ for Medium, and 1.8¢ for Refined, with special qualities selling up as high as 2¢ @ 2½¢.

Plates.—We quote: Tank, 1.9¢ @ 2¢; Shell, 2.15¢ @ 2.30¢; Steel Tank, 2.4¢ @ 2.5¢; Shell, 2.15¢ @ 2.25¢; Flange, 2.6¢ @ 2.75¢, and Fire-Box, 3¢ @ 3.25¢.

Structural Iron.—We quote: Bridge Plates, 1.9¢ @ 2¢; Universal Mill Plates, 2¢; Angles, 2¢ @ 2.2¢; Tees, 2.5¢ @

2.7¢, and Channels and Beams, 3.3¢, on dock.

Steel Rails.—There is absolutely nothing doing in Steel Rails. There are a number of inquiries in the market, but no business is done. The market is undoubtedly weak, but, as there are no sales, prices remain unchanged. On an exceptionally good order current quotation would very likely be shaded, but, as it is, the price remains nominally \$30 for moderate lots at Eastern mill. The passage of the Mills bill through the House has perhaps influenced the views of buyers somewhat, but otherwise has not affected the market.

Old Rails.—There is nothing new to report, \$20 being bid here, but with only sales of small lots at this figure.

Scrap.—The market is dull at unchanged prices. We note a sale of 200 tons American No. 1 Wrought Foundry Scrap at \$22, but what little trade there is mostly confined to small lots. Foreign Scrap is quoted at \$19 @ \$20.

Fastenings.—The market continues quiet, with Spikes at \$2 @ \$2.05 delivered and Angle Bars at 1.85¢ @ 1.9¢ delivered.

Billets.—There is nothing new to report in this market, quotations remaining unchanged. Sailer shipments are \$28.50 @ \$29, ex-ship, and steamer \$30.50, ex-ship.

Wire Rods.—Very little business is being done in Wire Rods, no sales having been reported during the week under review. Freight rates are still high, and no reduction is anticipated before the fall. We continue to quote \$39.75 @ \$40 for future and \$40.25 @ \$40.50 for near-by delivery.

Coal Market.

Anthracite Coal is moving off freely at prices agreed upon prior to the recent advance, but the wholesale jobbers are as yet unable to report sales in any amount at prices up to the new schedule. The advance had a decided effect in hastening the receipt of orders, and solicitude is shown on the part of buyers to expedite shipments while railroad tolls remain at the rates now in force. At the meeting of representatives of the Anthracite Coal roads, held in New York a week ago to consider the subject, it was decided to defer the proposed advance of tolls until at least August 15, when it is said a renewed effort will be made to add 10¢ @ 25¢ per ton. On this point the Philadelphia *Record* remarks: "The Reading and Jersey Central Roads were in favor of the advance, but the objections of the Lehigh Valley, Lackawanna and Hudson Companies, reinforced by the Pennsylvania, decided against the motion, and the rates will be maintained until probably September 1. Tolls are now higher than they have been at the corresponding period for many previous years, and only a fraction lower than the rates charged during last winter." Complaint is made of delay in loading vessels at shipping ports; nevertheless shipments both East and West have been unusually active from the principal points. The facilities for transportation from the mines are also spoken of as inadequate. Respecting deliveries, the Philadelphia *Ledger* says: "The Reading Company report that their orders for Coal already booked will more than cover their entire output for this month, and that no orders will be filled after the 31st inst., excepting at whatever prices may be ruling on and after the 1st prox." The Pennsylvania Railroad Company complain that they are receiving from the Reading scarcely half the amount of Coal that was agreed upon. The Pennsylvania last week carried 218,000 tons over their lines east of Pittsburgh. The Reading shipped during the week 35,000 tons to Port Rich-

mond and 7000 tons to Elizabethport. Philadelphia is quoting freights 90¢ @ \$1.05 and discharge to Boston; New York, 80¢ @ 85¢. Quotations are as follows: Wyoming Free Burning, f.o.b. at South Amboy and Weehawken, Broken or Grate, \$3.85; Egg, \$4.15; Stove and Chestnut, \$4.50; Reading Hard White Ash, Chestnut, \$4.40; Stove, \$4.50; Egg, \$4.25, and Broken, \$4.10. The small steam sizes can be bought as low as \$2.40, and Buckwheat, \$2 @ \$2.10 f.o.b.

The output of Anthracite Coal is in larger volume from week to week, in anticipation of a more active demand. For the week ending July 21 the total production was 877,285 tons, as compared with 787,704 tons the previous week, and as against 664,000 tons for the corresponding week last year. Since January 1 the aggregate is 18,784,381 tons, an increase of 147,000 tons over the corresponding period in 1887. Both the Schuylkill and Lehigh regions were more active last week, but the Wyoming district produced much less.

The Bituminous trade is mainly confined to deliveries on contract. Prices are irregular and are quoted \$3 @ \$3.25 alongside.

The Reading Company will build extensive Coal docks at Buffalo, in combination with the Vanderbilt interests, the Lehigh Valley's terminals at that point being insufficient for both companies.

Metal Market.

Copper.—During the week spot Chili Bars opened in London at £78. 15/, but subsequently improved to £79. 10/, at which they closed, while futures remained unaltered £78. Best Selected gave way from £76. 10/ to £75. 10/. Trading in our own market has been restricted to preparations for the month's settlement, with the tendency slightly a hardening one. Sales did not exceed 600,000 lb in the aggregate; spot at 16.75¢; July, 16.80¢ @ 16.85¢; August, 16.65¢; September, 16.55¢; October and November, 16.50¢, and December, 16.35¢. The closing prices were 16.75¢ bid and 16.85¢ asked. Rio Tinto shares rose on the Paris Stock Exchange 41 francs during last week.

Tin.—London opened at £87. 5/, spot, and £87. 15/, futures, rising gradually to £88. 12/6 and £89. 5/, respectively, but giving way this morning to £87. 12/6 and £88. The market over there has been discounting the anticipated favorable statistical statement that is to appear at the close of the month, and is, moreover, swayed by the contending manipulators. Our own market followed suit steadily, spot rising from 19.40¢ to 20.25¢, July bringing 20.30¢ toward the close yesterday; August, 19.60¢, and October, 19.50¢. On the Metal Exchange, on first call, 10 tons August Tin brought 19.10¢; 10 ditto, 19¢, and 10 September, 18.80¢, the market being weakened by the decline in London above noted. At the close 19¢ was bid and 20.25¢ asked *Tin Plates*.—The stocks are very light; the demand has been fair, but not heavy; prices remain unchanged, with a few exceptions, owing to extreme scarcity, such as the higher grades of Coke Tins and some sizes of Stamping Plates. We quote at the close, large lines, on the spot: Siemens-Martin Steel, Charcoal finish, \$4.85 @ \$5.25; ditto Coke finish, \$4.75; Terns, \$4.30 @ \$4.40; Bessemer Cokes, \$4.45 @ \$4.60, and Wasters, \$4.20 @ \$4.25. Coke Tins are selling at 13/ in Liverpool, for prompt delivery. This is an advance of 3d. owing to the higher price of Pig Iron.

Lead.—There were sold during the week in the open market some 500 tons Common Domestic Lead to consumers at \$3.87½ @ \$3.90, while at St. Louis the

market remains steady at \$3.80 @ \$3.85. At the Metal Exchange 500 tons changed hands, with a downward tendency, spot ranging between \$3.85 and \$3.90, July selling at \$3.90, August at \$3.90 @ \$3.92½, and September at \$3.90. The closing prices were 3.85¢ bid and 3.92½¢ asked. In London Soft Spanish declined from £13. 5/ to £13. 2/6, and English Pig from £13. 15/ to £13. 7/6. The London *Mining Journal* of July 14, alluding to the Paris meeting of European Lead producers recently held for the purpose of forming a syndicate to improve the position over there, remarks: "The constitution and surroundings of the Lead market are altogether unfavorable to such a combination. Not only has the Spanish production of Lead increased of late years, but that of America, it is computed, will this year be quite up to the average, the opening up of the mineral resources of Idaho and Montana, in all probability, more than compensating for the falling off in the productiveness of the Leadville carbonate deposits, which for years had been the bugbear of the Lead market. The production of Lead in all countries—and more especially in America—is not altogether dependent upon the price of the metal itself, a large quantity being produced from the smelting of argentiferous and auriferous ores, the Lead in which would not pay to extract in the absence of the precious metals, and thus large quantities are annually put on the market almost as a by-product. The position of the Lead market is not favorable to concerted action among producers; at the same time there is a margin for improvement in price without jeopardizing the market by induced heavy deliveries."

Spelter.—A moderate trade has been done at firm rates for Common Domestic, which remains 4½¢, while Silesian is worth 5¢ @ 5½¢, as to brand. In London Silesian has declined during the week from £16. 7/6 to £16. 2/6. The London *Mining Journal* of July 14 reviews the Spelter situation at some length, as follows: "The depression in the Spelter market appears to have arisen from a variety of causes, chief among which is undoubtedly the stagnation in the Copper market, which has directly influenced the Brass trade and those of kindred alloys of Copper and Zinc in this country. The sudden advance in the price of Spelter also disadvantageously influenced the consumption of Zinc-White produced at the Silesian, Rhenish and Belgian Zinc works, and to such an extent that certain factories ceased operation altogether. As a consequence, abnormal quantities of Silesian Spelter were thrown on the English market from the stock which had accumulated there, and also from Austria, where large quantities had been stored as a precautionary measure taken on the spreading of a report last year that that country was about to impose a new import duty. These supplies, however, appear now to be absorbed, and the price has risen on the relaxation of sale pressure. Another influence on the market may have been the knowledge that the price had receded to within dangerous proximity of the limit fixed by the Belgian and Rhenish smelters at the beginning of last year, when it was proposed to form a syndicate in co-operation with a well-known English firm for the withdrawal from the market of 10 % of the production, as reported in the *Mining Journal* of the 17th September last. Apart from this, however, there would appear to be every justification for the improvement in the Spelter market. The Galvanizing trade is in a very healthy state, and has developed to an unprecedented extent during the past two or three years. On the other hand, the production of Spelter has fallen off since 1885 from all sources of supply, ex-

cluding America, where the make is almost entirely absorbed in home industries, and does not affect the European market. The European supply, however, appears to be still too large to maintain the high price which ruled a few months since. But the statistical position of the market equally appears to warrant an advance on the present price. The best interest of all will probably be found in the happy medium somewhere between current quotation and the highest point reached."

Antimony.—Nothing of special interest has occurred; the local demand is moderate but steady, and prices have been sustained in a jobbing way at 13½¢ Cookson and 10¢ Hallett, the latter remaining £39 in London.

New York Metal Exchange.

The following sales are reported:

THURSDAY, JULY 19.

25,000 lb Lake Copper, July.....	16.75¢
16 tons Lead, September, seller's right to double.....	3.95¢
16 tons Lead, September, seller's right to double.....	3.97½¢
16 tons Lead, spot.....	3.87½¢

FRIDAY, JULY 20.

25,000 lb Lake Copper, November.....	16.50¢
16 tons Lead, spot.....	3.85¢
68 tons Lead, July.....	3.87½¢
200 tons Lead, September.....	3.90¢
50 tons Lead, July.....	3.85¢
20 tons Tin, August.....	19.50¢
20 tons Tin, October.....	19.50¢
45 tons Tin, October.....	19.45¢

MONDAY, July 23.

250,000 lb Lake Copper, spot.....	16.75¢
50,000 lb Lake Copper, July.....	16.80¢
16 tons Lead, spot.....	3.90¢
50 tons Lead, August.....	3.92½¢

TUESDAY, July 24.

175,000 lb Lake Copper, July.....	16.85¢
75,000 lb Lake Copper, July.....	16.80¢
10 tons Tin, August.....	19.60¢
64 tons Lead, August.....	3.92½¢

WEDNESDAY, July 25.

10 tons Tin, August.....	19.10¢
10 tons Tin, August.....	19.00¢
10 tons Tin, September.....	18.80¢
50 tons Lead, September.....	3.92½¢
16 tons Lead, August, seller's right to double.....	3.90¢

Financial.

The general tenor of trade accounts is of a hopeful character, despite the usual summer dullness expected at this season. Perhaps, in surveying the actual situation, the possibility of a general strike on the Northwestern railroads is the most disquieting feature. The radicals in that section would doubtless invite an extreme resort, but it is hoped wiser counsels will prevail. The outlook among the iron-workers is decidedly better. Benjamin G. Clarke, president of the Thomas Iron Company, is reported as saying: "We have all the business we can attend to from now until November. Daylight is appearing, and both steel and iron are firmer and in better demand than they have been." The passage of the Mills bill in the House is another factor having a direct bearing on this important interest, respecting which further developments are awaited. New York dry goods jobbers report a trade satisfactory for this season, with a good representation from interior and Western markets. The feeling of increased confidence is especially due to excellent crop prospects in this country, coupled with increasing indications of a shortage in Europe. Railway warfare continues. The Nebraska rates took effect on Monday, and are as follows: Classes 1, 2, 3, 4 and 5, new rate, 52, 44½, 34½, 26, 20½; old rate, 52, 45, 40, 25, 35 respectively. For 200 miles, classes 1, 2, 3, 4 and 5, new rate, 73, 63, 48½, 46½, 29½; old rate, 73, 65, 58, 46, 41, respectively. The greater proportion of the business is in the third, fourth and fifth classes. The Nebraska railroads ask for another conference with the commissioners to revise rates. The Illinois Central

has withdrawn its high rates in Mississippi and adopted the lower rates of the commissioners. The new tariff sheet in Colorado likewise took effect on Monday.

The general markets are quiet, excepting sugar, which is advancing.

The rate on zinc was reduced by the Eastern roads to 17¢ between Chicago and New York, to correspond with the rates on pig lead and spelter.

The total clearings of 38 cities for the week ended July 21 were \$943,772,861, against \$359,616,605 last year, an increase of 10.3 %. Outside of New York the increase was 5.5 %.

The Stock Exchange markets have been dull and irregular, though generally strong. At the beginning of the week in the foreign business a feature was an active demand for American bonds, particularly from Berlin. On Friday the denial of the report that the American cable had been bought by Mr. Gould caused a partial fall in Western Union. At a later hour buying was stimulated by the news that the cable rates would be advanced to 25¢ per word on or about August 1. On Saturday Chicago advices concerning the railroad situation were unfavorable, reporting fresh cuts in passenger and freight rates. Neither this news nor the loss in the bank reserve, however, had any influence upon prices. On Saturday there was an advance, based on the Government crop reports, and an improved demand for coal was a pretext for advancing Reading and other coal shares. As the Week closes more strength is developed.

United States bonds are quoted as follows:

U. S. 4½s, 1891, registered.....	108½
U. S. 4½s, 1891, coupon.....	107½
U. S. 4s, 1907, registered.....	127½
U. S. 4s, 1907, coupon.....	127½
U. S. currency 6s.....	119½

Purchase of United States bonds under circular of April 17: Amount purchased, 4s, \$18,741,500; 4½s, \$8,567,600. Total, \$27,809,100. Cost of 4s, \$28,802,333.70; of 4½s, \$9,226,298.70. Total, \$33,028,634.40.

The weekly bank statement showed a decrease in reserve above the 25 % legal requirements of \$1,294,000. The excess of reserve is thus decreased to \$26,440,400. The latter amount is, however, several times in excess of the reserve at the corresponding time last year. Specie showed a decrease of \$2,218,800. In loans there was very little change. The demand for money has been rather more active, with little change in the rates. Local institutions are not disposed to increase their discount lines in prospect of finding a better use for their funds at a later date, but outside money is plenty for temporary investment. We quote 60 @ 90 days' indorsed paper 4 @ 4½ %; longer dates, 5½ @ 5½ %. There was also some hardening of rates in the West. Surprise was occasioned by the failure of the old dry goods firm, Levi M. Bates & Co., who confessed judgments to the amount of \$126,264. The liabilities are reported to be about \$250,000, an amount probably not exceeding the actual assets. Mr. Bates lost heavily by a Detroit failure and business of late has not been profitably conducted. Wm. T. Coleman & Co., of San Francisco, propose to settle with their creditors at 40 cents on the dollar. It is now believed that the creditors of James D. Fish, formerly president of the Marine Bank, will receive their dues in full, the court having decided that certain real estate in this city is available for this purpose. In the United States Senate the bill appropriating \$1,000,000 to reimburse the depositors of the Freedmen's Saving and Trust Company for losses incurred by its failure was passed without a division. The \$700,000 in securities which were taken from the Union Bank, of Providence, by Teller Pitcher, now under arrest in Montreal, were recovered intact.

Sterling exchange is heavy; posted rates are \$4.87½ @ \$4.89½. The London *Economist* of July 14th says: "Gold is being withdrawn from the bank for export, and further amounts are, it is understood, to be taken for South America; and capital is being steadily, if slowly, absorbed in connection with the multitude of new undertakings that are being launched. All these are influences that work in the direction of dearer money."

The imports of merchandise at this port during the week were valued at \$8,303,000, of which \$3,000,000 represents dry goods. Since January 1 the total is \$266,870,000, as compared with \$262,300,000 for the corresponding period last year, and \$242,426,000 in 1886. The exports for the week amounted to \$6,289,265.

Imports.

The imports of Iron and Steel, Hardware, &c., at this port from July 14 to July 20, inclusive, and from January 1 to July 20, inclusive, were as follows:

Iron and Steel.		
	July 14 to July 20.	Jan. 1 to July 20.
	Tons.	Tons.
Pig Iron: Naylor & Co.....	909	5,244
N. S. Bartlett.....	200	3,300
Crocker Bros.....	200	6,200
G. W. Stetson & Co.....	100	11,100
Spiegeleisen: Dana & Co.....	200	301
Crocker Bros.....	193	1,857
Steel: J. Abbott & Co.....	61	324
W. F. Wagner.....	52	925
Pierson & Co.....	21	47
C. F. Boker.....	16	132½
N. Cohn & Co.....	15	167
F. S. Pliditch.....	6	271
H. W. Belcher.....	6	11
Chas. Hugill.....	4	164½
Steel Rods: Naylor & Co.....	397	11,708
J. Abbott & Co.....	206	3,715
R. H. Wolff & Co.....	88	2,483
J. A. Roebling's Sons.....	50	1,205
Dana & Co.....	21	1,152
Cary & Moen.....	20	579
Montgomery & Co.....	5	65
Iron: G. Lundberg.....	100	250
Ogden & Wallace.....	4	4
Steel Billets: J. Abbott & Co.....	108	1,345
Steel Sheets: A. Milne & Co.....	21	41
Ogden & Wallace.....	21	137
Naylor & Co.....	11	419
R. F. Downing & Co.....	3	3
Steel Plates: Naylor & Co.....	4	171
Steel Forgings: Thos. Prosser & Son.....	72	2,794½
Steel Strips: Naylor & Co.....	11	87½
Steel Tubes: J. S. Leng's Sons.....	4	39
Steel Wire: J. A. Roebling's Sons.....	88	153
Old Spring Steel: A. Milne & Co.....	105	105
Rivet Rods: J. Abbott & Co.....	150	2,227
J. A. Roebling's Sons.....	127	732
G. Lundberg.....	68	279
Page, Newell & Co.....	40	40
R. F. Downing & Co.....	36	62
Cooper, H. & Co.....	1	1
Iron Rods: Naylor & Co.....	175	275
Iron Blooms: A. Milne & Co.....	101	101
Sheet Iron: T. B. Coddington & Co.....	26	814
Iron Rivet Rods: J. Abbott & Co.....	308	2,212
Iron Beams: R. F. Downing & Co.....	25	194
Swedish Wire Rods: A. Heyn, Naylor & Co.....	103	280
Ferromanganese: C. L. Perkins.....	50	50
Charcoal Iron: C. S. Mersick & Co.....	1,000	3,700
Cotton Ties: J. S. Leng's Sons.....	60	70
Iron Wheels: R. F. Downing & Co.....	110	110
	6	6

Tin Plates.

	Boxes.	Boxes.
Phelps, Dodge & Co.....	16,537	290,296
D. Van Dusen & Co.....	6,733	149,582
T. B. Coddington & Co.....	5,276	93,869
Bruce & Cook.....	3,234	57,538
A. L. Thomsen & Co.....	2,875	61,211
N. L. Cort & Co.....	2,154	60,250
G. B. Morewood & Co.....	2,000	24,439
H. R. Demilt & Co.....	1,634	10,068
Pratt Mfg. Co.....	1,131	96,368
R. Crooks & Co.....	1,096	38,474
S. Shepard & Co.....	943	12,227
Corbiere, Fellows & Co.....	807	2,139
Central Stamping Co.....	794	17,520
Wolff & Roeding.....	786	18,674
Merchant & Co.....	594	9,410
Lombard, Ayres & Co.....	500	6,028
E. S. Wheeler & Co.....	964	1,933
Bridge & Beach Mfg. Co.....	339	339
A. M. Underhill.....	21	21

Metals.

	Pounds.	Pounds.
Tin: Muller, Schall & Co.....	437,236	6,362,675
Knauth, N. & Kuhne.....	20,836	43,236

Nickel: McCoy & Sanders.....	10,150	122,490
Sheet Zinc: Naylor & Co.....	112,014	112,014
	Casks.	Casks.
Antimony: Hendricks Bros.....	34	136
	Tons.	Tons.
Zinc: Naylor & Co.....	50	50

Hardware, Machinery, &c.

American Metal Company, Mineral, sacks, 525	
Baldwin Bros.'s & Co., Gun Barrels, cs., 8	
Bur, Julius, Ironwork, etc., 1	
Boker, Hermann & Co., Anvils, 136; Mdse., cs., 28;	
Arms, cs., 50; Chains, cks., 23	
Cobiere, Fellows & Sparks, Mach'y, crates, 27;	
do., cs., 4	
Codd, Hiram, Mdse., cs., 22	
Downing, R. F. & Co., Chains, cks., 19	
Davis, Moses, Arms., cs., 6	
Field, Alfred & Co., Mdse., cs., 3	
Godfrey, Chas. J., Arms, cs., 5	
Graef Cutlery Company, Cutlery, cs., 6	
Hammacher, Schlemmer & Co., Chains, box, 1;	
Mdse., cs., 69	
Hartley & Graham, Arms, cs., 54; Gun Barrels, cs., 5	
Knauth, Nachod & Co., Cylinder, pcs., 22	
Lamarche's Sons, Nails, cks., 25	
Merchants' Disp. Company, Mach'y, cs., 37;	
Ironware, etc., 1	
Morris, L. W. & Son, Razor Hones, cs., 18; Tin Labels, box, 1	
Moss Engraving Company, Mdse., cs., 2	
Oastler, W. C., Mach'y, pcs., 10	
Sanderson & Son, Mach'y, cs., 3; do., pcs., 11	
Schoverling, A., Arms, cs., 46	
Shoverling, Daly & Gales, Arms, cs., 19	
Stillman, O. B., Mach'y, cs., 2	
Scheldon, G. W. & Co., Hdwr., cs., 16	
Taylor, Thos., Mdse., cs., 5	
Taylor, Jas., Mach'y, cs., 62	
Whitney, Pousland & Co., Mach'y, pcs., 3	
Wiebusch & Hilger, Lm., Arms, cs., 14; Mdse., cs., 28; Chains, cks., 25	
Windmuller & Roelker, Arms, cs., 3	
Witte, John G. & Bro., Cutlery, cs., 4	
Order: Stoves, cs., 4; Mach'y, pcs., 2	

Exports of Metals.

	July 14 to July 20.	Jan. 1 to July 20.
	Pounds.	Pounds.
Copper: J. Abbott & Co.....	464,115	6,763,045
Lewisohn Bros.....		3,879,022
F. A. Lomal.....		2,581,293
American Metal Company.....	250,519	4,682,972
G. H. Nichols.....		223,939
J. Bruce Iamay.....		112,000
S. Mendel.....		560,000
Ledoux & Co.....		110,276
Muller, Schall & Co.....		430,000
Copper Queen Con. M. Company.....		224,034
J. Kennedy, Tod & Co.....		112,026
H. Becker & Co.....		1,250
Orford C. & S. Rfg. Company.....		224,841
Robt. M. Thompson.....		125,000
Thos. J. Pope, Sons & Co.....		765,840
J. Parsons & Co.....		206,250
Bridgeport Copper Company.....		112,000
C. Herold.....		250,000
Phelps Bros.....		6,250
R. W. Jones.....		189,984
Copper Matte: Williams & Terhune.....	1,400,550	32,395,290
Lewisohn Bros.....		3,021,610
American Metal Company.....	224,636	1,497,199
J. Abbott & Co.....		285,000
C. Ledoux & Co.....		485,800
F. W. J. Hurst.....		184,288
G. H. Nichols.....		722,777
H. T. Nichols & Co.....		180,995
Old Copper: Burgass & Co.....	6,700	489,774

Wages in Steel Works.

The Pittsburgh *Despatch* has published the following tabular comparison of the wages paid in the steel works at Braddock and at Chicago:

Blast Furnace Department.	Furnace No. 2, Union Steel Company, Chicago.
SLIDING SCALE.	STANDARD SCALE.
Turn 12 hours.	
Keeper.....	\$2.23
First helper.....	1.70
Second helper.....	1.60
No third helper.....	2.45 th'd h'p'r.
Stoveman.....	1.70
Top filler.....	1.61
Filler.....	1.51

Converter Department.

First converter.....	\$1.33	per 100 tons.	\$1.80	per 100 tons.
First pitman.....	1.32	"	1.80	"
First ladleman.....	.99	"	1.80	"
Blower.....	1.08	"	2.34	"
Bottom builder.....	1.06	"	.89	tonnage of 2 turns.
Spiegel melter.....	1.33	"	1.80	per 100 tons.

Blooming Department.

Heater.....	\$5.00	per 100 tons.
Heater's help'r.....	\$1.32	per 100 tons.
Assist. roller.....	1.09	"
Leverm'n (sh'rs).....	.63	"

Rail Mill Department.

Roller.....	\$210.00	per month.
Leverman.....	\$3.10	turn 12 h.
Spell leverman.....	2.85	"
First engineer.....	2.38	"
Water tender.....	2.00	"
Straightener.....	1.43	100 tons on entire output of mill.
		9.00 100 tons on individual work.

Engineer and Boiler Department.

	Per turn of 12 hours.
Water tender.....	\$1.95
Asst. w. tender.....	1.43
Ingot loco. eng.....	1.72
1st blowing eng.....	2.38
2d blowing eng.....	1.90
3d blowing eng.....	1.57
Cupola bl'g eng.....	1.52
Crusher engin'r.....	1.43
Sp'gel ladle eng.....	1.19
Skull br'k'r eng.....	.91
Boiler tender.....	1.57
Bloom train en.....	2.00

The Edgar Thomson figures are from the sliding scale, on the basis of \$30 at mill. The Chicago figures are said to be from the official scales of the Bridgeport Mill, and the North Chicago Rolling Mill Company's mill.

WESTERN IRON MILLS.

The Lockout Ended.

The Lockout in the Western iron mills, which has been in progress since the beginning of the present month, has been definitely settled by the manufacturers agreeing to sign the scale and resume work as soon as repairs are completed. A meeting of the Manufacturers' Association of Iron, Steel and Nails was held in Pittsburgh on Wednesday, the 18th inst., with President A. F. Keating in the chair. There was a large attendance of manufacturers as it was known that important business would be brought before the meeting. After a somewhat lengthy session, the following resolution was unanimously adopted: "Resolved, That the Conference Committee of manufacturers be dissolved, and that all members of the Association of Manufacturers of Iron, Steel and Nails who have not signed the Amalgamated Association scale be absolved from all pledges, written or verbal, and are authorized to act in their individual capacity regarding the starting of their works." This action dissolves the conference committee, and, of course, puts an end to the lockout. In addition to this the manufacturers' association is practically dissolved, and unless a reorganization is effected there will be no conference committee appointed by the manufacturers to meet a similar committee from the Amalgamated Association, when the present scale expires next year. Each firm will settle the scale question individually and on its own responsibility. At this time it is of course impossible to state what the manufacturers will do before another year passes, but it is the impression that a mistake has been made in allowing the association to go to pieces. It has been pointed out that in 1882, when the great strike took place, the manufacturers were strongly united and succeeded in administering a defeat to the Amalgamated Association, and it is claimed that if the manufacturers had been as well united this year as they were then they would have been successful and would have compelled the Amalgamated Association officers to recognize and sign their scale. It is thought that before the time arrives for the annual conference next year the manufacturers will have realized that they have made a mistake and that their organization, which at present is about dissolved, will be reorganized on a stronger basis than it ever has been, and that they will be prepared to meet the Amalgamated Conference Committee as a united body. The dissolution of the Manufacturers' Association of Iron, Steel and Nails in no way affects the standing of the Western Iron Association as has been erroneously stated. The two organizations are entirely separate and distinct. The first named dealt with labor questions exclusively, while the last named organization deals with prices only, and is still in

existence. While a number of the mills are still idle and have not signed the scale, it is for the reason that repairs have not been completed and not because of any determination to resist signing the scale. The manufacturers realize that they have lost the fight, and those whose mills are yet idle will sign the scale as soon as they are ready to resume operations. Since our last issue the following named firms have signed the scale:

Sharon Iron Company, Limited, Sharon, Pa.
 Canonsburg Iron and Steel Company, Canonsburg, Pa.
 P. L. Kimberly & Co., Limited, Sharon, Pa.
 Chess, Cook & Co., Pittsburgh, Pa.
 Arethusa Iron Works, New Castle, Pa.
 Zug & Co., Limited, Pittsburgh, Pa.
 Henry Lloyd Son & Co., Pittsburgh, Pa.
 Columbia Iron and Steel Company, Uniontown, Pa.
 Cherry Valley Iron Company, Leetonia, Ohio.
 Hussey, Howe & Co., Limited, Pittsburgh, Pa.
 Kirkpatrick & Co., Limited, Leechburg, Pa.
 Chartiers Iron and Steel Company, Limited, Pittsburgh, Pa.
 P. L. Kimberly & Co., Limited, for Atlantic Iron Works, Sharon, Pa.
 North Chicago Rolling Mill Company, Bay View, Wis.
 Falcon Iron and Nail Company, Youngstown, Ohio.

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, July 25, 1888.

There has been further improvement in the statistical position of Block Tin during the first half of July, and to this fact, rather than to what is generally termed "speculative manipulation," is due the advance in prices. The policy of the producers in refraining from sending forward excessive supplies doubtless has some bearing upon the situation, but heavy deliveries have latterly figured more conspicuously than anything else and make a deep impression. Returns for the first half of the month show total deliveries of no less than 2800 tons, which, together with the smaller receipts from primary points, make a total reduction of 7600 tons in the supply on spot and afloat. There is still a considerable amount of Metal due consumers on three months' contracts. Shipments from the Straits, it is stated, will have been moderate the last half of the month, and a further decrease in stocks is expected. Speculation has been moderate, however, despite the improved situation.

Copper has fluctuated to a very moderate extent, and the turnover of contracts during the week has been rather small as well, outside interest being tame and the purchases by consumers still of a conservative nature. Chili Bar three months' futures are maintained at £78 by the syndicate, and new form contracts are at within £5 @ £6 of that price. The syndicate is still a ready buyer of Chili Bars at £78, but does not go beyond that price. It is the belief in well-informed quarters that the syndicate efforts are directed toward holding the market on the £78 level, and that no great advance is contemplated. There are rumors afloat of a projected amalgamation of the lead-

ing Spanish mine interests, which, if carried to a successful end, will greatly strengthen the situation. It is also stated that means are being sought in Paris to conciliate the interests of the English smelters. Several important sales of furnace material have been made by the Société des Métaux, particulars of which are kept strictly private. The Bratsberg Company have concluded sales covering the entire production of their mines up to June, 1889, at 13 francs. The contracts specify that the output shall not exceed 2000 tons.

The Scotch Pig-Iron market is showing decided improvement in tone. Makers have ceased storing in "makers' brands," and the "bears" in the speculative arena have consequently turned about in alarm to cover their "short" sales of warrants. This movement is reflected in an advance on warrants to 38/9. There has been no further curtailment of the production, and the change above referred to is attributed to the receipt at Birmingham of orders for a new arsenal for the Ameer of Afghanistan. The latter, it is anticipated, will require the use of a considerable quantity of Scotch Pigs. In to-day's transactions in Scotch warrants as high as 39/ was touched, and the firmness there was reflected in other branches. Makers' brands are better by about 6d than a week ago in most instances, and Middlesboro' Pig has improved 6d, while Bessemer Pig displays greater firmness at present rates.

The Steel trade has shown but a moderate degree of animation. Prices are a shade lower on Blooms and Slabs, but otherwise fairly steady.

There is not the slightest improvement in the demand for any class of old material.

There has been no important change in the condition of the Tin-Plate trade. A steady business is reported in most quarters and the favorable position of supplies, in the face of the heavy production, together with the further rise in the cost of Block Tin, serves to hold values very steady.

A new make of Siemens Steel in bars will shortly be placed on the market, and also the make of a new Bessemer Steel works, both located in Glamorganshire.

The Hope Plate Iron Works are again in operation. The sale is reported of the Glaisdall furnaces for £8900. The Newport rolling mills have been started by the John Hill Company, employing 30 puddling furnaces.

Scotch Pig.—More business doing and the market stronger:

No. 1 Coltness, f.o.b. Glasgow	48/
No. 1 Summerlee, " "	47/6
No. 1 Gartaherrie, " "	44/6
No. 1 Langloan, " "	44/6
No. 1 Carnbroe, " "	39/6
No. 1 Rhotts, " at Leith	45/
No. 1 Glangarnock, " Ardrossan	43/
No. 1 Dalzellington, " "	40/
No. 1 Eglinton, " "	39/

Steamer freights, Glasgow to New York, 5/; Liverpool to New York, 7/6.

Cleveland Pig.—The market quite strong with demand active. No. 1 Middlesboro', G.M.B., 35/; No. 3 do., 32/6.

Bessemer Pig.—Demand brisker, and prices show greater firmness. West Coast brands, mixed numbers, 43/, f.o.b. shipping point.

Spiegeleisen.—There has been no material change the past week. English 20%

quoted 80/, f.o.b. N. W. England shipping point.

Steel Rails.—A fair volume of business at steady prices. Standard sections quoted at £3. 17/6, f.o.b. at N. W. England shipping point.

Steel Blooms.—Values rather weaker, but a fair trade at the decline. We quote at £3. 12/6 for 7 x 7, f.o.b. at N. W. England shipping point.

Steel Billets.—Business moderate and prices barely steady. Bessemer, 2½ x 2½ inch, £3. 17/6, f.o.b. at N. W. England shipping point.

Steel Slabs.—Rather weak market, with demand light. Bessemer, £3. 16/3, f.o.b. at N. W. England shipping point.

Steel Wire Rods.—A quiet market, with prices steady. Mild Steel No. 6 quoted at £5. 13/9 and No. 5 at £5. 10/, f.o.b. at N. W. England shipping point.

Old Rails.—The market very quiet. Tees quoted at £2. 15/, and Double Heads £2. 17/6, c.i.f., New York.

Scrap Iron.—No improvement in the demand. Heavy Wrought quoted at £2. 5/ @ £2. 7/6, f.o.b.

Crop Ends.—Only small sales making. Bessemer quoted £2. 5/ @ £2. 7/6, f.o.b.

Tin Plate.—The demand has been good, and prices are firm. We quote, f.o.b. Liverpool:

IC Charcoal, Allaway grade	14/6 @ 15/
IC Bessemer steel, Coke finish	13/ @ 13/3
IC Siemens	13/3 @ 13/6
IC Coke, B. V. grade	13/ @ 13/3
Charcoal Terne, Dean grade	12/6 @ 12/9

Manufactured Iron.—The market rather quiet. Prices a shade higher on Sheets, but otherwise unchanged. We quote, f.o.b. Liverpool:

Staff. Ord. Marked Bars	£ s. d.	£ s. d.
" Common	4 17 6	@ 5 0 0
" Bl'k Sheet, singles		@ 6 15 0
Welsh Bars (f.o.b. Wales)	4 12 6	@ 4 15 0

Tin.—The market somewhat easier to-day, and less active, showing £1. 15/ decline from the highest price. Straits quoted at £87. 10/6 @ £87. 15/, spot, and £88 @ £88. 5/ for three months' futures.

Copper.—Transactions have been moderate, but the market remains very firm. Chili Bars closed at £79. 15/, spot, and £78 @ £78. 5/, three months' futures. Best Selected, £75, nominal.

Lead.—There has been a very fair business and a better tone to the market. Soft Spanish, £13. 15/ at the close.

Spelter.—Demand has run fairly and prices show but slight change. Silesian, ordinary, £16. 2/6 at the close.

It is reported that the vacancy in the presidency of the Columbia School of Mines, New York City, caused by the resignation of President Barnard, may be filled by the selection of a Western metallurgist of national reputation, Prof. Wm. B. Potter. His selection would give general satisfaction to those interested in the success of this institution, but his retirement from his present field of usefulness would be the cause of universal regret among his present associates.

Crude oil from Lima, Ohio, will arrive at Chicago through a pipe line this week, and it is stated that the company expect to distribute 800,000 barrels of it per day.

Hardware.

Manufacturers and merchants are making active preparations for the fall trade, which has not yet opened in any considerable volume. Prices are receiving careful revision, and some minor changes are to be noted, but the market, as a whole, remains without important variation. Prices generally are not regarded as strong, and buyers are careful not to order beyond their requirements.

Cut Nails.

Considering the season, a fair trade is being done in Nails, and for the month has been above the average. Prices are pretty firmly adhered to, at least so far as standard brands are concerned. We continue to quote \$1.90 to \$1.95 for carload lots on dock, and \$1.95 to \$2 for small lots from store.

Wire Nails.

The demand is moderate, and prices continue without material change. Carload lots at factory are quoted regularly at \$2.45 to \$2.50, and small lots from store are offered at the usual advance.

Miscellaneous Prices.

The Association of Emery Wheel manufacturers have been formed, and most of the manufacturers have agreed upon the adoption of a common list to secure uniformity in list prices, which will be appreciated by the trade, to whom the diversity of lists has been a source of annoyance. The list, which goes into effect August 1, is on substantially the same basis as those heretofore in use. No agreement in regard to discounts has been entered into. The following companies are members of the Association:

NORTHAMPTON EMERY WHEEL CO.
UNION STONE CO.
SPRINGFIELD GLUE AND EMERY WHEEL CO.
GRANT CORUNDUM WHEEL CO.
NORTON EMERY WHEEL CO.
WALTHAM EMERY WHEEL CO.
STERLING EMERY WHEEL CO.
CELLULOID EMERY WHEEL CO.
NEW YORK BELTING AND PACKING CO.
PHILADELPHIA EMERY WHEEL CO.
LEHIGH EMERY WHEEL CO.
VITRIFIED WHEEL CO.

J. L. Otis, of the Northampton Emery Wheel Company, is the president; W. P. Lashure, of the Grant Corundum Wheel Company, vice-president, and C. L. Allen, of the Norton Emery Wheel Company, secretary and treasurer.

Some of our readers may not have observed the change in the classification and price of Screw Hooks and Strap Hinges and of heavy welded Hook Hinges which has been made by the manufacturers. It is indicated below, the prices given being f.o.b. factories, 60 days, or 2 per cent. discount for cash in ten days:

6, 8, 10 and 12 inch, per pound..... 3%
14, 16, 18 and 20 inch, per pound..... 3%
22, 24, 30 and 36 inch, per pound..... 2%
..... 2%
..... 2%
..... 2%

The Nimick & Britton Mfg. Co., Pittsburgh, Pa., have issued their Padlock list in a separate sheet with the quotation of discount 70 per cent.

The prices on Tackle Blocks remain without open change, but slightly lower quotations are made in some cases, and the market is not quite as regular as could be desired.

Heavy Hammers and Sledges remain in a somewhat demoralized condition, and some low quotations are current.

Copper Rivets and Burrs are rather weaker than heretofore, notwithstanding the condition of the Copper market, and slightly lower quotations are made by some of the manufacturers. There is, however, some irregularity in the prices at which

the different manufacturers are offering the goods, for which quotations are from 7½ to 10 per cent. apart.

The Lock market shows little sign of improvement, low prices prevailing and competition between the manufacturers being animated.

The prices of Padlocks also rule low, the extreme figures at which the goods are sold being somewhat lower than those which have prevailed for considerable time.

The following changes have recently been made in the extras on Rope: The extras on uncoiled Manila and Sisal Rope have been reduced from ½ to ¼ cent per pound, a similar change having been made on coarse and medium uncoiled Hay Rope. The extras on the fine Hay Rope have been changed from 1½ to 1¼ cents. The base prices remain as before.

The Mallory-Wheeler Company, New Haven, Conn., and 64 Reade street, New York, have issued under date of July, 1888, a pamphlet containing revised list prices and discounts for their Locks, Knobs, &c. The list remains on substantially the same basis as heretofore, the changes which are made being for the purpose of equalizing some goods that were out of proportion. The company have also added an entirely new line of low-priced Locks and Latches, which are furnished with their flat Steel Keys. They have also omitted some of their former numbers, which were prefixed by an "x," and added a number of patterns. At the same time the company send out extra pages for insertion in their catalogue. The regular discounts remain as before, all goods in the list being subject to a discount of 50 and 10 per cent., except Padlocks and Padlock Keys, which are subject to a discount of 65 and 10 per cent., a bonus of 2 per cent. in addition for cash within 30 days.

The following quotations on goods made by E. Blair, Bucyrus, Ohio, will be of interest:

Blair's Adjustable Husker, per gross..... \$8.00
Blair's Adjustable Clipper Husker..... 7.00
Blair's Fodder Squeezer, per doz..... 2.00
Blair's Climax Fodder Squeezer, per doz. 1.25

The market for Steel Squares continues practically as at our last report, when we referred to the termination of the combination. Since that time prices have, however, settled slightly, somewhat lower quotations being made owing to the active competition between some of the makers. This line of goods is regarded as quite unsettled, and there are no indications of an immediate arrangement by which prices will be controlled.

The Water Elevator and Purifier Company, Cincinnati, Ohio, in a circular relating to their Bucket Pump, allude to its special features and state that they are desirous of placing the sale of the Pumps in the hands of energetic and responsible dealers. They further state that they will ship sample orders for six Pumps, f.o.b. Cincinnati, at \$10 each, subject to a discount of 40 and 5 per cent.

Ammunition.

A report is current that the E. C. Meacham Arms Company have made application to the association to be reinstated, but inquiry develops the fact that it is without foundation, no such proposition having been made by the company. That the company had made such application is referred to by some opposed to them in interest as indicating that they have failed in obtaining a supply of goods and as being *prima facie* evidence that their stock is broken and their supply cut off. As such report is without foundation the conclusion thus drawn from it of course falls to the ground, but the fact

that the report is thus circulated indicates the annoyance caused by the cut prices of the company, and the efforts which are necessary by their competitors to break as far as possible the force of their quotations. Moreover advices indicate that the company are in fact supplying a good many goods at the slight concessions which it is their present policy to make, while at the same time many other goods are sold in a regular way, thus making the policy a profitable one. It is generally acknowledged that in the present condition of things a sufficient supply of goods can easily be obtained by the company which will enable them to continue their policy at least during the season. In this state of things there is a more pronounced feeling on the part of the trade that the association will be acting the part of wisdom if without unnecessary delay they reach such an understanding with the Meacham Company as will remove this demoralizing influence. It is assumed that with the recent withdrawal of the requirement that contract houses purchase one-third of their goods from the manufacturers and with such other minor modifications as may be desirable, arrangements might be agreed upon which would be satisfactory to the company and advantageous to all concerned. It is the general opinion of the best-informed parties that such a result is likely ultimately to ensue, unless in the meantime something radical is done in the way of recasting the existing system by which the association is marketing its goods. It is also believed that the company are now willing to be reinstated, provided they are given all the privileges of other specials.

The real difficulty in the case, however, is not the position taken by the Meacham Company, occupying though they do an influential position in the trade, but in the fact that the system which the association has adopted, and on the whole carried out thus far with a good measure of success, has apparently run its course, so that it fails to accomplish the desired ends of protecting the different classes of trade and securing uniformity of prices. This is indicated not only by the fact that retail buyers are able, in many cases, to obtain from their jobbers slight concessions in price, but is also alluded to in the remark of an exceptionally well-informed party that a large proportion of the contract houses are believed to be obtaining their goods with an extra 2½, 5 or 7½ per cent., given indirectly and in a covert way. To such an extent is this irregularity in price carried that well-posted buyers, large and small, who have not heretofore had the benefit of these cut prices are endeavoring to procure them, and the association in the present juncture are apparently not disposed to look too closely into the facts, or to press their authority too far. The general fact that the trade are not disposed to enjoy the protection given them by the carefully elaborated scheme of the association, but in this case, as in so many other combinations, are willing to divide their extras, is a matter that must force itself upon the attention of the manufacturers, and unless the existing unsettled and unsatisfactory condition of things can be corrected, it is thought not unlikely there may be a decided change in their policy, and the adoption of a scheme of prices much simpler than those in force, in which there would not be attempted so complicated a protection for the trade.

Items.

Horton, Gilmore, McWilliams & Co., of Chicago, are making a new departure for a Hardware house. In addition to the 40 salesmen they now employ, they propose to put on from 10 to 15 more men to sell Jewelry to those who handle such goods—embracing dealers in fancy articles, drug,

gists, gentlemen's furnishers, dry-goods stores, &c. They will carry a full line of Optical Goods, Pocketbooks, Oxidized Jewelry and fine Cutlery. Their stock will be as complete as any of the best Jewelry houses in Chicago, with the exception of Watch Cases and Movements, which would have been added if they had room to carry them. Their Revolver department has been enlarged and made one of the most complete in the country. They recently gave an order for one of the largest stocks of Carving Knives known by the oldest salesman to be taken outside of Chicago. Their Bicycle and Tricycle business has exceeded their expectations and they intend next season to make it a more prominent branch of their business. The store has just been remodeled, to give more room to the Cutlery and Jewelry departments, and sliding ladders have been put along the shelves to expedite getting out orders. The removal of the offices to the front of the store has also given increased capacity for laying out goods in the rear, their facilities having been badly cramped by their greatly increased business. The room thus gained represents an increase of about 20 per cent. of space in the shipping department. The offices are now well adapted also for the accommodation of the increased force of clerks rendered necessary by the expansion of the business. The efficiency of the force has further been increased by the engagement of men of special training and proved ability to take charge of the several departments. It is their intention in all the lines handled to be second to none, whether they deal exclusively in Firearms, exclusively in Jewelry or exclusively in Hardware.

Sidney Shepard & Co., Buffalo, N. Y., have issued their July 1 illustrated price list of goods manufactured by them. Two pages are devoted to illustrations of their works, office and salesrooms, the remainder of the pamphlet being occupied by Deep Stamped Ware, Shallow Stamped Ware and Trimmings, Pieced Tinware, Japanned Ware and miscellaneous goods. The latter department includes an extensive variety of household specialties, Water Coolers, Coal Vases, Coal Hods and Grocers', Druggists' and Spice Dealers' Tinware. They will be pleased to mail a copy of this pamphlet on application.

The Mercantile Mfg. Co., Cleveland, Ohio, issue circulars relating to the Regent, Cyclone and Hercules Wringers, in which these goods are illustrated, with list prices.

J. F. Wollensak, Chicago, Ill., issues a circular and price list relating to the Eagle and the Shield Transom Lifters, which are similar to his Class 3 and Class 4 goods, except that they are a cheaper grade, and are put on the market to meet the demand for a low-priced Transom Lifter. The Shield Lifter has the patent Safety Spring, which acts as a cushion and receives the shock to prevent the breaking of the glass should the Transom be allowed to fall accidentally or through carelessness.

W. B. Avery Mfg. Company, Cleveland, Ohio, issue a price list devoted to their Avery Seamless Steel Elevator Bucket, Avery Combined Leather Punch and Saw Set and the Holt Combined Anvil and Vise. These goods are illustrated, with information in regard to their special features and advantages.

From the advertisement on page 42 it will be seen that King, O'Connor & Co., Baltimore, Md., call attention to the Little Giant Scroll Saw, the advantages of which they allude to. Its simplicity and the ease with which it is worked are points that they specially mention, as well as the low price at which it is offered.

E. Blair, Bucyrus, Ohio, issue circulars relating to his Hog and Pig Rings and

Ringers, Blair's Fodder Squeezer, Adjustable and Clipper Husking Pins and the Climax Fodder Squeezer, in which these different articles are illustrated.

By the announcement which appears on page 46 it will be seen that the attention of manufacturers is called to the advantages possessed by Des Moines, Iowa, as a location for manufacturing enterprises. Among these it is mentioned that there are 16 lines of railroads there, and that coal is procurable at a very low figure.

The Pacific Lock and Seal Company, 304 North Eighth street, St. Louis, Mo., have issued a prospectus relating to the company and their manufactures. It is proposed to incorporate the company under the laws of Missouri. The pamphlet gives a full description with illustrations of the different goods for the manufacture of which the company hold patents.

The circular issued by Walter Hart, 65 Stone street, New York, describing the National Flag-Staff Bracket, of which he is the patentee, calls attention to the advantages possessed by it. It is pointed out that the separate parts when put together allow of the Bracket being set on any surface, giving any desired angle to the pole. Its safety is also referred to as follows:

By examining the cut at head of circular you will notice that the separate parts, when put together, allow of the Bracket being set on any surface, giving any desired angle to the pole. This Bracket is essentially a safety one, for as it is removable (and the only one that is) it should be made a fixture to the end of the staff, where it will balance the overhang of the staff, and act as a handle to the butt. By this it removes the danger (which exists with every other Bracket) arising when leaning over the ground to place the staff in position, for with mine, the staff being already in the Bracket, all that is required is to slip the foot of the Bracket into the staples, which latter should be secured by screws.

The Brackets are made with diameter of socket ranging from 1½ to 2 inch, and a Group Bracket is also furnished providing for a display of five flags.

Shultz Belting Company, St. Louis, Mo., have sent us a very neat zylonite tablet for the pocket, which is used for calling attention to their Belting, and which gives on its last page a price list. This company are running their works, we are advised, with a full complement of operators, and report a large sale from the home and branch warehouses for their Shultz's Patent Filled Leather Belting.

In a game of base-ball between the teams of Smith, Lyon & Field and William Bryce & Co., on the 21st inst., at Prospect Park, the former were defeated by the following score:

Innings.....	1	2	3	4	5	6	7	8	9	
W. B. & Co.....	4	3	1	2	3	1	1	1	1	17
S., L. & F.....	0	0	0	0	0	1	0	3	0	4

C. H. Gurney & Co., manufacturers' agents for the sale of Steel, Heavy Hardware, and Railway, Machinists' and Mining Supplies, 247 and 249 Lake street, Chicago, have just issued a superb catalogue, comprising 288 pages of illustrations and price lists, bound in heavy boards with beveled edges, covered with olive-colored cloth. The name of the firm is stamped in gilt on the back and on the side. The contents comprise the full line of Tools manufactured by the Atha Tool Company, the Boston and Lockport Block Company's specialties, Fisher & Norris's goods, the Syracuse Bolt Company's products, &c. Each cut is given ample room for a proper display, and the whole work is above criticism as a specimen of good bookmaking. The large line of general Hardware manufactured by the Penn Hardware Company, for whom this firm have been sole Western agents for the past six years, is not included in this catalogue, but is covered by a special catalogue of

352 pages, which is forwarded to applicants. For the use of their office and salesmen Messrs. Gurney & Co. bind the two catalogues together, making a very handsome volume of 635 pages, which is put up in the best of leather with flexible covers.

The Rockford Cutlery Company, Keokuk, Iowa, send out a circular illustrating the Boss Wire Cutter. It is stated that it will cut No. 7 Wire with one-half the power required in the use of other Cutters.

We have received from the Moser Holder Company, Belleville, Ill., a circular relating to their Bundle or Package Carriers, to which we have before alluded. They advise us that they have 43 machines and can turn out 40,000 holders per day. They are appointing agents in the principal cities.

Our readers will observe among the Special Notices one in which a Hardware business in Northern Indiana is offered for sale by A. & B., who may be addressed in care of this office. The stock is referred to as invoicing about \$5000 and the business as being a growing one in a prosperous town.

The announcement in our last issue in regard to the American Screw Company's new Screw was received by the trade with much interest. It is, however, proper that we should state that the company are not yet prepared to put these goods on the market, and are not intending to offer them to the trade before next Spring. They have but just perfected the development of the requisite machinery, and before they can supply the goods in any quantity they will have to build more machines, which they are now doing.

The Silver & Deming Mfg. Company, Salem, Ohio, issue an illustrated catalogue and price list of Ensilage and Feed Cutters, which they manufacture. In the preface to the pamphlet, which is dated July 1, the manufacturers direct special attention to the various improvements recently made in the construction of their Ohio Ensilage and Feed Cutters. The first 30 pages of the circular are devoted to illustrations and descriptions of these Cutters, and a number of testimonials are also printed. The remainder of the pamphlet consists of a treatise on Silos and Ensilage compiled from various sources for the Silver & Deming Mfg. Company. The construction of Silos and the value of Ensilage are not very generally understood, and a little treatise of this kind will be of much value. Accompanying the catalogue is a folded circular also relating to the Ohio Ensilage and Feed Cutters.

The Palmer Mfg. Company, 290 Pearl street, New York, favor us with advertising sheets concerning some of their goods. One sheet illustrates and describes their new Oblong Embossed White Brilliant Tray, which is some 11 x 14 inches in size. Two other circulars refer to their White Embossed Crumb Tray and Brush, in silver finish, the different designs being marked Nos. 35 and 55 respectively.

The Reading Hardware Company.

are now clearing away the *débris* of the late fire, so as to get in shape to rebuild as early as possible. They carried an insurance of \$208,000 on their entire works. Of this amount of insurance about 80 per cent. is involved in the fire. The remaining portion of their works, consisting of Iron and Brass Foundries, Butt and Pulley departments and Screw Factory, are being run to their full capacity, and are now turning out Apple Parers, Coffee Mills, Japanned Store Shelf-Brackets, Cast Butts, Gravity and Surface Blind Hinges, Harb;

ster's and Lull & Porter Shutter Hinges, Gate Hinges and Latches, Turnbuckles, Tower Bolts, Barrel Bolts, Flat, Cased, Acme and Excelsior Shutter Bolts, Japanned and Bronzed Thumb Latches, Barn-Door Latches, Japanned Store-Door Handles, Japanned and Bronze Plated Door-Pulls, Japanned and Bronze Plated Drawer-Pulls, Common Frame and Axle Pulleys, and Jail Padlocks, Barn-Door Hangers, Barn-Door Rollers and Barn-Door Rail, Hay-Fork Pulleys and Grindstone Fixtures, Bench Screws and Foot Scrapers, Porch Irons and Well Wheels, Bed Fasts and Store-Truck Casters, Plate, French and Bed Casters, Window-Shade Brackets, Roller Ends, Waffle Irons, Sad Irons and Wood Screws. On last Monday, the 23d inst., they started up the Manhattan Hardware Company's works, and by August 1st they will be making quite a variety of the leading goods, and by September 1st they will be prepared to furnish two-thirds of their line of Builder's Hardware and one-third of their line of Locks, Knobs and Escutcheons. They expect to have the buildings that were destroyed by fire rebuilt within the next 90 days and restocked with new machinery, so that by January 1st they will be able to meet all the demands of the trade. Within one week they will have their plating and bronzing departments running, which will enable them to supply their well and favorably known line of Geneva Bronzed Hardware. They carry large and well-assorted stocks at their warehouses in New York, Philadelphia and Chicago, and are filling a large portion of their orders from same. The company ask us to thank the trade most cordially for their sympathy and favors, and they hope to be able at an early date to resume the pleasant relations in all departments which have so long existed.

Oliver Bros. & Phillips,

Pittsburgh, Pa., under date of July 20, issue the following quotations on their extensive line of goods. They also send out a circular relating to the Star Steel Fence Posts, Stiff Horse Hitchings and the Star Picket and Tent Pins, in which these articles are illustrated. Their quotations are as follows:

Page in catalogue.

Merchant Bar Iron.....	\$1.80 card rates
Steel Buggy Tire, 3-16 inch and heavier, per lb., net.....	2.25¢
Bridge, Tank, Plate and Angle Iron. Light I Beams and Channels. Special prices quoted on receipt of specifications.	
46 Bridge Rivets, made of Soft Welding Steel, $\frac{5}{16}$ and larger, per lb., net.....	4.4¢
46 Bridge Rivets, made of Soft Welding Steel, $\frac{1}{2}$, per lb., net.....	4¢
All Rivet Steel is tested to the following requirements: Tensile strain per square inch, 50,000 to 60,000 lbs. Elongation in 8 inches, 28 per cent. Reduction of area, 60 per cent.	
4 Horseshoe Iron, best quality, per lb., net.....	2.25¢
156 Steel T Rail, 12, 16, 20 and 25 lbs. to the yard, per lb., net.....	1.90¢
Steel Plow Anvils, 3, $3\frac{1}{2}$, 4, $4\frac{1}{2}$ and 5 in. long, per lb., net.....	4¢
89 Iron Wedges, per lb., net.....	3.4¢
89 Steel Wedges, Standard pattern, oil finish, per lb., net.....	3.4¢
89 Steel Wedges, Standard pattern, axe finish, per lb., net.....	4.2¢
89 Steel Wedges, California or Truckee pattern, oil finish, per lb., net.....	5¢
89 Steel Wedges, California or Truckee pattern, axe finish, per lb., net.....	5.2¢
73 Steel Crowbars, not over 50 lbs. each, per lb., net.....	3.4¢
Steel Crowbars, 50 to 100 lbs. each, per lb., extra.....	1¢
Steel Crowbars, 100 to 175 lbs. each, per lb., extra.....	2¢
Steel Crowbars, 175 to 250 lbs. each, per lb., extra.....	3¢
89 Beetle Rings, per lb., net.....	4.4¢
161 Square Steel Harrow Teeth, headed, packed in kegs, 1, $\frac{3}{4}$, $\frac{1}{2}$ inch, per lb., net.....	2.75¢
Square Steel Harrow Teeth, headed, packed in kegs, $\frac{5}{8}$ inch, per lb., net.....	2.75¢
Square Steel Harrow Teeth, headed, packed in kegs, $\frac{1}{2}$ inch, per lb., net.....	3¢
167 Diamond Steel Harrow Teeth, headed hammer point, per lb., net.....	3¢
Diamond Steel Harrow Teeth, headed shear point, per lb., net.....	3¢

61 Screw Hook-and-Hinges, with Patent Hooks.....	$\frac{3}{4}$ to 1 in. diameter, per lb., net..... 4.4¢ $\frac{5}{8}$ in. diameter, per lb., net..... 5.4¢ $\frac{1}{2}$ in. diameter, per lb., net..... 7.4¢
60 Screw Hook and Strap Hinges, for orders of 2000 pairs and over, per lb., net.	
6, 8, 10, 12 in. 14, 16, 18, 20 in. 22 to 36 in.	3.4¢ 2¢ 2.4¢
Ditto, for orders of 500 pairs and less than 2000 pairs:	
6, 8, 10, 12, in. 14, 16, 18, 20 in. 22 to 36 in.	3.4¢ 3.4¢ 2.5¢
Ditto, for orders of less than 500 pairs, per lb., net:	
6, 8, 10, 12 in. 14, 16, 18, 20 in. 22 to 36 in.	3.4¢ 3.4¢ 2.4¢
On orders for 2000 pairs and over we will make same freight allowances as on Carriage Bolts and Strap and T-Hinges (see freight clause below).	
For orders less than 2000 pairs prices are f.o.b. Pittsburgh.	
61 Cellar-Door Hinges, with hook for either wood or stone, 8 in. and longer, per lb., net.....	3.4¢
125 Grass Rods, per lb., net, 9-16 in., $\frac{1}{2}$ in.	4¢
125 Heel Bolts, Square Neck, per lb., net:	
$\frac{5}{8}$ x $4\frac{1}{2}$, $\frac{5}{8}$ x $4\frac{1}{4}$, $\frac{5}{8}$ x 4, 3.70¢, 3.80¢, 4¢	
$\frac{5}{8}$ x $3\frac{3}{4}$, $\frac{5}{8}$ x $3\frac{1}{2}$, $\frac{5}{8}$ x $3\frac{1}{4}$, 4.20¢, 4.40¢, 4.60¢	
62, 63 Strap and T Hinges, per cent. off, net.....	70¢&10
28 to 31 Carriage Bolts (New List), per cent. off for net cash.....	75¢&52
\$500 bought between January and July, or July and January, $\frac{3}{4}$ per cent. extra.	
\$1000 bought between January and July, or July and January, 7 per cent. extra.	
The extra discounts payable by pool commissioner.	

FREIGHTS.

Actual freight may be allowed on all shipments of Strap and T Hinges and Carriage Bolts of 250 pounds or over to the following points, viz.: Boston, New York, Philadelphia, Baltimore, Pittsburgh, Cincinnati, Louisville, East St. Louis, Chicago, Milwaukee, Detroit, Toledo, Cleveland, Buffalo, Rochester, Syracuse, Albany and all intermediate points, provided the freight to such point does not exceed the freight to the place above named to which the place of destination is nearest.

28 to 31 Tire Bolts (New List), per cent. off, net cash.....	70
32 Machine and Square Head Bolts, per cent. off, net cash.....	70¢&10
34 Coach and Lag Screws, per cent. off, net cash.....	75
Gimlet Point Lag Screws, per cent. off, net cash.....	75
37 Skeln Bolts, per cent. off, net cash.....	75
38 Bolt Ends, per cent. off, net cash.....	70¢&10
48 Hot Pressed Square Nuts, per lb. off new list, net.....	5.4¢
49 Hot Pressed Hexagon Nuts, per lb. off new list.....	5.4¢

52 to 54 Washers, standard sizes for Bolt:	
Inches..... $\frac{5}{8}$ to $1\frac{1}{4}$ $\frac{1}{2}$ 7-16 $\frac{5}{8}$	
Cts. per lb..... 3.4 3.4 4 5	
Inches..... 5-16 $\frac{1}{2}$ 3-16	
Cts. per lb..... 6 7 8	

Nuts and Washers in less lots than one keg each size, $\frac{1}{4}$ ¢ per lb. extra.

Nuts and Washers in 5-lb. boxes, 1¢ per lb. extra.

44 Bridge and Roof Bolts, 1 to 2 inches diameter, $1\frac{1}{2}$ feet and over, per lb., net.....	3¢
44 Bridge and Roof Bolts, $\frac{5}{8}$, $\frac{3}{4}$ and $\frac{7}{8}$ inches diameter, over 4 feet long, per lb., net.....	3.4¢
44 Bridge and Roof Bolts, $\frac{5}{8}$, $\frac{3}{4}$ and $\frac{7}{8}$ inch diameter, from $1\frac{1}{2}$ to 4 feet long, per lb., net.....	3.4¢
44 Bridge Bolts, with enlarged ends, per lb., extra.....	1.4¢
44 Wrought-Iron Bridge Plates, punched, per lb., net.....	3.4¢
45 Cast-Iron Washers, per lb., net.....	2.8¢
108 Screw Hitching Rings, light, with $\frac{1}{4}$ Ring, per 100, net.....	\$2.90
108 Screw Hitching Rings, heavy, with 5-16 Ring, per 100, net.....	\$3.15

Mattocks, per cent. off, net..... 60, 10 and 5

Grub Hoes, per cent. off, net..... 60, 10 and 5

Railroad and Clay Picks, per cent. off, net..... 60 and 10

Coal Miners' Picks.

No.....	1	2	3	4
Weight, lbs.....	2	2 1/2	3	3 1/2
Length, inches.....	16	17 1/2	19	20 1/2
Price, per dozen, net cash.....	\$3.90	4.10	4.25	4.50

Stone Picks.

Lbs.....	5	6	7	8	9
Price, per dozen, net cash.....	\$4.50	5.00	5.50	6.00	6.50

Steel Fence Pickets.

55 to 57 Fence Pickets, pat. machine bent; 2 ft. 10 in. long, made of $\frac{3}{8}$ round steel, less per cent. net.....	30¢&10
Figure A, Acorn Top, 9-inch spread, at 30 cents per lineal foot, less per cent. net.....	30¢&10

Figure B, Circle Top, 6-inch spread, at 24 cents per lineal foot, less per cent. net..... 30¢&10 |

Figure B, Circle Top, 9-inch spread, at 25 cents per lineal foot, less per cent. net..... 30¢&10 |

Figure C, Diamond Top, 6-inch spread, at 25 cents per lineal foot, less per cent. net..... 30¢&10 |

Figure C, Diamond Top, 9-inch spread, at 27 cents per lineal foot, less per cent. net..... 30¢&10 |

Figure D, Scalloped Top, 6-inch spread, at 28 cents per lineal foot, less per cent. net..... 30¢&10 |

Figure D, Scalloped Top, 9-inch spread, at 30 cents per lineal foot, less per cent. net..... 30¢&10 |

Figure E, Oval Top, 28 cents per lineal foot, less per cent. net..... 30¢&10 |

Galvanized Fence Pickets at 10 cents per lineal foot extra, net..... |

We make of heavier steel and to longer lengths, if required, charging proportionate advance.

108 Floor Hooks, per lb., net:

$\frac{3}{4}$ in., 3.4¢, $\frac{5}{8}$ in., 5.4¢.

59 Patent Spiral Lariat and Picket Pins, made of steel, per doz., net..... \$1.50 |

Star Lariat or Picket Pins, made of steel, per doz., net..... 80¢ |

180 Horse Hitchings, self colored, per doz., net..... \$1.65 |

Solid Steel Hop Bars, per doz., net..... 12.00 |

Ball Drills, per lb., net..... 7.4¢ |

Stone Drills, per lb., net..... 6.4¢ |

Timber Dogs, Michigan Pattern, per set, net..... 11¢ |

Steel Post-Hole Diggers, per doz., net..... \$12.00 |

The Star Steel Fence Posts, 10¢ each, less 15 per cent, net.

Chain.

110. Coil, self-colored or black, best Close Link. In ordering state quality wanted.

Hammer Chain, per lb., net:

3-16, $\frac{1}{4}$, 5-16, $\frac{3}{8}$, 7-16, $\frac{1}{2}$, 9-16 in. 9.4¢, 6.4¢, 5.4¢, 4.4¢, 4.4¢, 4.10¢.

$\frac{5}{8}$, $\frac{3}{4}$, $\frac{7}{8}$, 1, $1\frac{1}{4}$, $1\frac{1}{2}$ in. 3.0¢, 3.40¢, 3.65¢, 3.75¢, 3.65¢, 3.60¢.

Crane Chain, per lb., net:

$\frac{1}{4}$, 5-16, $\frac{3}{8}$, 7-16, $\frac{1}{2}$ in. 13.4¢, 9.4¢, 7.90¢, 6.90¢, 6.40¢.

9-16, $\frac{5}{8}$, $\frac{3}{4}$, $\frac{7}{8}$, 1 in. 6.15¢, 6¢, 5.65¢, 5.50¢, 5.35¢.

Test for Crate Chain:

$\frac{1}{4}$, 5-16, $\frac{3}{8}$, 7-16, $\frac{1}{2}$ in. 2, 3, 4 tons.

9-16, $\frac{5}{8}$, $\frac{3}{4}$, $\frac{7}{8}$, 1 in. 5, 6, 8, 10 1/2 tons.

Weight per 100 ft. of Close Link:

3-16, $\frac{1}{4}$, 5-16, $\frac{3}{8}$, 7-16 in. 42, 75, 110, 160, 200.

$\frac{1}{2}$, 9-16, $\frac{5}{8}$, $\frac{3}{4}$, $\frac{7}{8}$ in. 260, 320, 410, 500, 790.

Weight of Stud Chain per fathom:

1, 11-16, $\frac{1}{4}$, 1 3-16, $\frac{1}{4}$, 1 5-16, 57, 63, 71, 76, 83, 92 lbs.

$\frac{1}{2}$, 17-16, $\frac{1}{4}$, 1 9-16, $\frac{1}{4}$, 1 11-16, 105, 110, 122, 133, 145, 152 lbs.

$\frac{3}{4}$, 113-16, $\frac{1}{4}$, 1 15-16, 2, 2 1/2, 2 3/4, 165, 179, 195, 209, 225, 240, 255 lbs.

Test for Stud Chain:

1, $\frac{1}{4}$, 1 3-16, $\frac{1}{4}$, 1 5-16, 21, 25 1/2, 27 3/4, 31 1/4, 38 tons.

$\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{4}$, $\frac{1}{4}$, 45 3/8, 53 3/4, 61 3/4, 71, 77 1/2 tons.

120. Brake, with Eye Bolts for Cars, per lb., net cash, $\frac{5}{8}$ in., 5.4¢; 5-16 in., 6¢.

115. Well, bright, with Ring and S Hook, total length 29 inches, No. 2, per doz., net cash..... \$1.00 |

Well, bright, with Ring and S Hook, total length 24 inches, No. 2, per doz., net cash..... 90¢ |

114. Log, bright or self-colored, with wrought Swivel, two Hooks, or Hook and Ring, assorted lengths, per lb., net cash:

$\frac{5}{8}$, $\frac{1}{2}$, 7-16 in., 3.70¢, 4.15¢, 4.40¢.

$\frac{3}{8}$, 5-16, $\frac{1}{4}$ in., 4.65¢, 5.30¢, 6.40¢.

119. Lariat, bright, 3-16, with two Swivels, Snap and Ring, per doz., net cash..... \$7.25 |

116. Stay, Tongue and Fifth, black, per lb., net..... |

$\frac{3}{8}$, 5-16, $\frac{1}{4}$ in., 4.4¢, 5¢, 5.4¢.

100. Wagon Lock and Stretcher, black, 5-16 in., per lb., net..... 5.4¢ |

100. Wagon Lock and Stretcher, black, $\frac{1}{4}$ in., per lb., net cash..... 6¢ |

$\frac{1}{4}$ per lb. advance for bright.

121. Hame Clips, Extra Wrought, Polished, 2 doz. in box, per doz., net..... 14¢ |

112. Trace Chains, Straight Link, with Rings:

6 1/2-6-2, per pair..... 32¢ 7-12-2, per pair..... 55¢

6 1/2-8-2, " " " " 35¢ 7-14-2, " " " " 70¢

6 1/2-10-2, " " " " 38¢ 7-16-2, " " " " 47¢

6 1/2-12-2, " " " " 48¢ 7-18-2, " " " " 52¢

6 1/2-8-1, " " " " 48¢ 7-12-1, " " " " 66¢

6 1/2-12-1, " " " " 53¢ 7-18-1, " " " " 58¢

7-8-2, " " " " 38¢ 7-10-0, " " " " 63¢

7-10-2, " " " " 42¢

Without Swivel, 1¢ per pair less. Twist Links, 2¢ per pair advance. Hooks, 2¢ per pair advance. Standard Weights, 3¢ per pair advance.

99. Lap Links, see Baker Standard List, off List..... 50¢ |

99. Lap Rings, see Baker Standard List, off List..... 50¢ |

99. Repair Links, see Baker Standard List, off List..... 50¢ |

Cold Shuts.

5-16 inch, net cash, per pound..... 11¢ |

$\frac{3}{8}$ " " " " " " " " 9 1/2¢ |

$\frac{1}{2}$ " " " " " " " " 1¢ |

Wagon Hardware.

+ 84. Wagon Box Strap Bolts and Bolster Plates, 70 and 10 per cent off..... Net |

+ Wagon Box Strap Bolt Braces, concaved to fit our Straps:

Each, net..... 10 x $\frac{1}{4}$, 12 x $\frac{1}{4}$, 14 x $\frac{1}{4}$ in. 3 1/4¢, 3 1/4¢, 3 1/4¢.

+85, Wrought Hammer Straps, light pattern, each, net.	4¢
+85, Wrought Hammer Straps, heavy pattern, each, net.	5¢
+86, Wrought Rub Irons, each net.	4¢
+86, Steel Pole Caps, bent to shape.	8 1/4¢
+Steel Pole Caps, with Holdback, bent to shape, each, net.	11¢
+101, Single Tree Hooks, 3/4 and 1-3/2, each, net.	2 1/4¢
+101, Single Tree Irons, long pattern, each, net.	3.50¢
+121, Stay Chain Hooks, each, net.	3 1/4¢
+92, Wagon Box Rods, narrow track, with Patent Solid Collar, each, net.	6¢
+92, Wagon Box Rods, wide track, with Patent Solid Collar, each, net.	6 1/4¢
+93, Wagon Box Rods, narrow track, without Patent Solid collar, each, net.	5 1/4¢
+93, Wagon Box Rods, wide track, without Patent Solid Collar, each, net.	6 1/4¢
+Wagon Box Rods, narrow track, with Malleable Collar, each, net.	6 1/4¢
+Wagon Box Rods, wide track, with Malleable Collar, each, net.	6 1/4¢
+91, Wagon Brake Ratchets, plain, each, net.	7 1/4¢
+91, Wagon Brake Ratchets, finished, with Guard, each, net.	10¢

Straight Clips, Stamped Baker.	50¢
Welded Clips, Stamped Baker.	50
Welded Clips, with Rings.	50¢
Welded Clips, with Hooks, Stamped Baker.	50
Twisted Clips, Stamped Baker.	50
Ferrules and Hooks, Baker Pattern.	50
Sets of Welded Clips for Single Trees or Double Trees, Baker Pattern.	50
Neck Yoke Irons, Centers, Ferrules and Rings, Baker Pattern.	50¢

Total Diam. of length	rd. part.	Price per 100	Extra price per 100 for each additional inch in length.	Per ct. off.
7.....	3/4 in.	\$2.00	12¢	20
8.....	7-16 in.	4.30	15¢	20
9.....	1 1/4 in.	5.35	20¢	20
10.....	9-16 in.	6.70	23¢	20
11.....	3/4 in.	8.20	28¢	20

+95, Seat Hooks, per lb., net.	4 1/4¢
Steel Wrenches, per lb., net.	6 1/4¢
+95, Corner Irons, Wrought, Nos. 1 and 2, per lb., net.	6 1/4¢
+97, Plow and Wagon Clevises, per lb., net.	12¢
126, Bull Tongue Clevises, per lb., net.	12¢

Southern Plow Clevises, Steel, per pound, net.	5 1/4¢
107, California Tire Rivets and Burrs, made of Soft Welding Steel, 5-16, per pound, net.	9¢
107, California Tire Rivets and Burrs, made of Soft Welding Steel, 3/4, per pound, net.	10¢

+87, Wagon Box Staples, 1 1/2 in. to 2 1/2 in., to clinch, per 1000, net.	\$0
+87, Wagon Box Staples, made from Bevel Box Iron, to rivet on, per 1000, net.	\$5.50
+105, Neck Yoke Eyes, 1/2, each, net.	3; 9-16, 3.25¢
+106, Neck Yoke Eyes, with 3/8 Rings, 4.75¢; with 7-16 in. ring, each, net.	5¢

+94, Steel King Bolts, regular pattern, 7/8, 1 1/4 and 1 1/2 diameter, per pound, net.	3 1/2¢
107, Soft Steel Wagon Rivets, 1/4 in. diameter, 1 in. and longer, per pound, net.	5¢
107, Soft Steel Wagon Rivets, 1/4 in. diameter, 3/4 and 1 in. long, per pound, net.	6¢
107, Soft Steel Wagon Rivets, 3-16 in. diameter, 1 in. and longer, per pound, net.	6¢
107, Soft Steel Wagon Rivets, 3-16 in. diameter, 3/4 and 1 in. long, per pound, net.	7¢
107, Wagon Rivets, in 5-pound paper boxes, per pound, extra.	1 1/2¢
107, Wagon Rivets, 25-pound wood boxes, per pound, extra.	1 1/2¢
107, Wagon Rivets, in less lots than 1 keg each size, per pound, extra.	1 1/4¢
150, Ox Yoke Staples, per set, extra.	80¢
+90, Double Tree Plates, per pound, extra.	5 1/4¢
+88, Coupling Plates, per pound, extra.	3 1/4¢
+89, Tongue Plates, per pound, extra.	5 1/4¢
+90, Neck Yoke Plates, per set, 2 pieces, per set, extra.	5¢

22, Tongue Cap Iron, 1 1/2, 2 and 2 1/4 in. wide, per pound, extra.	2 1/4¢
22, Sand Band Iron, 1 1/2 in. wide, per pound, extra.	2 1/4¢
22, Hub Band Iron, per pound, extra.	2 1/4¢
22, Hub Band Shape, made of Soft Welding Steel, per pound, extra.	2 1/4¢

Single Trees Ironed with Baker Irons.	
No. 1, 20 in. to 26 in. Southern Plow Single Tree, per dozen.	\$1.50
No. 1 1/2, 28 in. or 30 in. Southern Plow Single Tree, per dozen.	1.00
No. 1 1/2, 28 in. or 30 in. Western Plow, Single Tree, per dozen.	1.90
No. 2, 30 in. Western, extra heavy Single Tree, per dozen.	2.50
No. 3, 36 in. Wagon, per dozen.	3.00
No. 4, 34 in. Wagon, per dozen.	3.50
No. 5, 36 in. Southern Plow Double Tree.	3.00
No. 6, 40 in. Neck Yokes, per dozen.	4.00

On those goods marked + freight is equalized with Chicago, Cleveland, East St. Louis and Racine. All other goods f.o.b. cars or boat at Pittsburgh.

Trade Topics.

The following review of the Hardware market of Louisville, Ky., will be of interest:

The Hardware trade of Louisville, Ky., is showing signs of decided improvement in volume. The jobbing houses have completed the

work of taking stock, and disclose a very satisfactory status. The amount of business transacted in the last six months was considerably above the average, and the outlook for the coming season is good. The salesmen are all out on the road again, and meet with ready response from the country merchants. The continued decline in prices of several lines of manufacture did not prevent the dealers keeping up full stocks, although at each stage down the manufacturers insisted that the lowest possible limit had been reached, yet down they came one more notch, evidencing wonderful elasticity of their statements, or else their possibilities; but now that bottom is believed to be touched really, there begins to be heavy buying, showing that the trade is disposed to have some confidence, and is anxious to invest idle money in staple goods that are likely to make fair returns.

The resumption by the mills is received with satisfaction by the trade generally, and contracts will now be filled on time instead of recourse being had to the provision which is invariably printed in bold type on all letter-heads of the manufacturers, "Orders subject to strikes, &c., at mill."

Carriage and Wagon Goods move briskly, some Barb Wire is going out and the Wire-Nail trade is better than it ever has been. The Agricultural Implement dealers are receiving full stocks of their wares, looking for a heavy demand this fall.

The Ohio Valley Centennial Exhibition.

Among the Hardware exhibits noticed at the Ohio Valley Centennial Exposition were a line of Axles, Wagon, Carriage and Buggy, the production of the Standard Axle Mfg. Company, Wheeling, W. Va.

J. B. Schroeder & Co., Cincinnati, Ohio, show a varied and excellent line of Bronze Builders' and Cabinet Makers' Hardware, consisting of Loose Pin Butts, Knobs, Escutcheons, Drawer Pulls, Handles, Mortise Locks, &c.

Henry Disston & Son, Philadelphia, Pa., make a magnificent exhibit of their productions, consisting for the greater part of Circular, Cross-Cut and Hand Saws, Masons' Tools of every variety, the exhibit being displayed in a glass cabinet some 10 x 16 feet and 18 feet high, the front top of which is surmounted by a well-executed likeness of Henry Disston.

The Black Diamond File Works, of Philadelphia, Pa., adjoining the exhibit of Henry Disston & Sons, display a line of their productions in a compact and well-arranged form, showing these well-known Files to good advantage.

The Fischer Ice Tool Company, Hamilton, Ohio, display a large assortment of Ice Tools, Machinery, &c., the product of their works.

The Riverside Iron Works, for whom the Hazen Company, Cincinnati, are agents, provide an interesting display of their productions, consisting of Steel Pipe of every description, Steel Nails, Tubing, Bent Cold Steel Blooms, Billets, Ore, Pig Metal, &c.

The Whitely Steel Company, Springfield, Ohio, exhibit their Hot and Cold Rolled Steel, the production of this Company being entirely taken up annually in the construction of the Whitely Harvesting Machines.

The Buffalo Scale Company, through their agents, the Oppenheimer Hardware Company, Cincinnati, Ohio, exhibit a line of Postal, Counter, Market, Platform, Grain, Dormant, Stock, and numerous other Scales.

The Bandle Arms Company, Cincinnati, Ohio, display a select line of Sporting goods of every description, Guns, Powder, Shot and Hunting outfits.

One of the best arranged and most comprehensive displays of the Exposition is that of the Fred. J. Meyers Mfg. Company, Covington, Ky., occupying space in the main (Park) Exhibition Hall of 400 sq. feet,

in which is exhibited a large and varied line of their productions, such as Brass and Steel Wire Cloth, Sieves, Garden and Lawn Trellis, Settees, Chairs, &c., Bird Cages, Fire Place Fenders, Wire Office and Bank Screens, Flower Stands, Vases, Weather Vanes, Office and Bank Railings, Window Guards, &c., and a variety of Hardware Novelties, including the famous Hunter Flour Sifters and Mixers, of which a huge pyramid is formed. This firm had the honor of having their Fencing, Window Guard, &c., recommended for use in and about the Centennial Buildings by the Honorable Board of Commissioners.

Johnson Bros., Cincinnati, Ohio, exhibit a line of the Zeck Pattern Axe, of which they are manufacturers, which they claim to be superior in quality and finish, mentioning that none but the finest grade of Steel enters in its construction.

Arrangement of Stroes.

The illustration, Fig. 255, represents a Chain Rack, which is used by Kellogg, Johnson & Bliss, Chicago, of whose establishment we gave a description some time

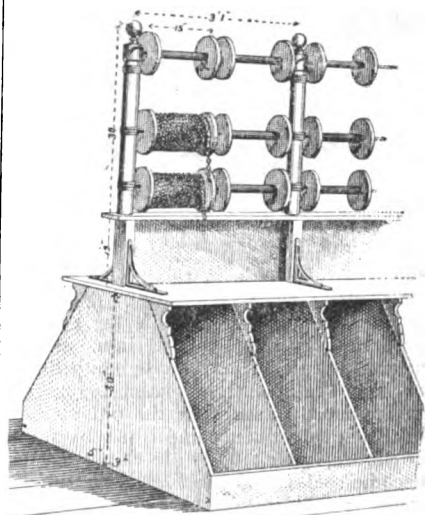


Fig. 255.—Chain Reels.

ago. The arrangement is, it will be seen, a combination of a Chain Reel and bins. The bins can be used for a variety of purposes, Kellogg, Johnson & Bliss using them for getting together small bills of Builders' Hardware by shipping department, but they will serve admirably for Nails, Horseshoes, &c. The rack consists, it will be observed, of wooden posts with 1/4-inch iron rods extending between them, on which wooden spools revolve. The upper row of rods can be lifted out of its place by means of open slots in the posts. The other rows are arranged with a deep hole on the left post, which will permit the rod when thrust all the way into it to clear the other post and thus be lifted out. The rack is alike on both sides, so that it can be used as conveniently on one side as the other. It is utilized for holding a great variety of Sash Chain, as well as Coil and other Chains.

The London *Engineer* illustrates in its impression of July 6 one set of the twin-screw engines of the great Italian warship *Re Umberto* as they stood in the erecting shop. They will indicate 10,000 horsepower on each screw, and are fitted with Joy's valve-gear. The *Re Umberto* is one of three ships of nearly similar type. She is 400 feet long, 75 feet beam, and, displacing 13,251 tons, will draw 28 feet 6 inches. She is intended to steam at 18 knots, and will carry four 110-ton guns in barbettes.

Lever Latch and Handle.

This article, which is put on the market by J. F. Wollensak, Chicago, Ill., was patented April 24, 1888. It is intended for use on refrigerators, ice boxes, &c. One of the points made in regard to it is that it may be used for either right or left

the pool cable companies to maintain a rate of 25 cents a word, instead of the 12-cent rate that has prevailed for a year.

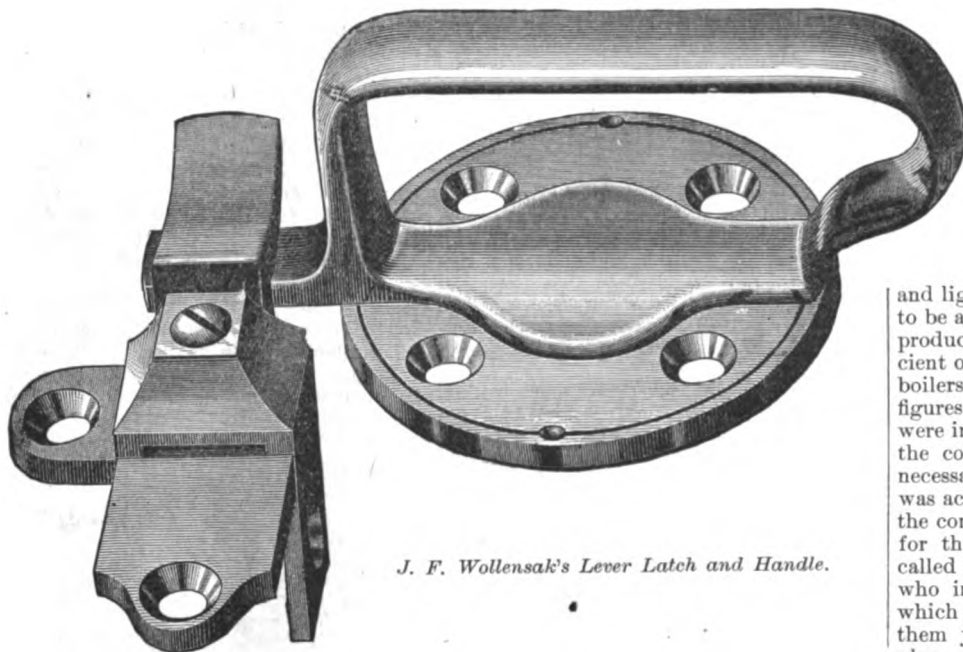
Cash Register Bank.

This attractive and ingenious toy is put on the market by the Henry C. Hart Mfg.

Mich., to recover a balance on a contract for the construction of the plant of the defendants, which the defendants refused to pay, claiming that the contract had not been completed by the plaintiffs. It appears that in March, 1887, Lean & Blair contracted to build the works of the Detroit Copper and Brass Rolling Mills upon an entirely novel design, which was the conception of Mr. Lean, the senior member of the firm, and that, as the plan of running a copper works with gas fuel was altogether new, the figures of fuel consumption, &c., given by the defendants should be used as the basis from which to determine the number of gas producers that would be required to run the works, including the boilers as well as the furnaces.

When the plant was completed and lighted up last August, it was found to be a complete success, except that the producer capacity was found to be sufficient only to run the furnaces, without the boilers. It was then discovered that the figures given by the company as the basis were incorrect. The plaintiffs then made the company a proposition to build the necessary additional gas producers, which was accepted, but afterward canceled by the company, and, being unable to figure for themselves what was necessary, they called in as an expert a furnace builder, who induced them to make alterations which cost them \$13,000 and then left them just where they were in the first place—with just enough gas to run the furnaces, without the boilers. A verdict was rendered giving the plaintiffs the full amount of their claim, with interest and all costs. The amount involved was \$17,000.

Electric lighting has been successfully tried on the Skane-Holland Railway, in Sweden, where a train was dispatched from Helsingborg, fitted with electric light in all the carriages except one, so as



J. F. Wollensak's Lever Latch and Handle.

doors. That it may thus be reversible, the catch is made in two pieces, permitting either right or left use. The screw in the face of catch clamp is for the purpose of regulating the tension, and by means of this it may be so controlled as to hold the door tight, which is regarded as an improvement over the old method, in which this was accomplished by means of rubber, which is liable to harden and become useless. As indicated in the cut, there is a spring pin in the handle which engages in the notches of the plate, holding the handle in position when unlatched. These handles are made in polished brass, nickel-plated brass and japanned malleable iron and are packed one-quarter dozen in a box, with screws.

The A. & W. Flour Sifter.

A new flour sifter has just been brought out by the Adams & Westlake Company, of Chicago. It is made of tin, with a



The A. & W. Flour Sifter.

concave wire bottom and side-crank with four agitator wires. The crankshaft can be unscrewed and withdrawn, so that the agitator can be lifted out. It is finished with a straight, round scoop-handle, which is claimed to be more convenient than the usual cup-handle. The accompanying illustration will convey an excellent idea of its appearance. It is put up in cases of one dozen, wrapped in six different colors of tissue paper, making a very attractive package.

The cable tariff war has been ended by an agreement between the Commercial and

Company, Detroit, Mich., and is represented in the illustration given herewith, which indicates the special feature which gives name to it. By pressing the button on the top of the safe any amount, from 1 cent to \$9.99, may be registered. The money is inserted in the back of the bank, where there is a device to prevent its being shaken out. The bank is 4½ inches in diameter, and has a brass front, the dial being in bright colors, and the finish of



Cash Register Bank.

the toy being attractive. The bank is packed in a wooden box with a sliding cover, three dozen banks in a case.

A decision has just been rendered by the United States Court at Detroit, Mich., in the suit brought by Messrs. Lean & Blair, engineers and contractors, of Pittsburgh, Pa., last September, against the Detroit Copper and Brass Rolling Mills, of Detroit,

to demonstrate its superiority. There were altogether 17 incandescent lamps in use, fed from an accumulator in the luggage van. The light was very good and steady, and all the lamps could be lighted or extinguished in a moment. The installation has been effected by Messrs. Edwin Audrén & Co., Gothenburg, and it is the intention to fit all the express trains between Christiania and Helsingborg with electric lights.

The Butz Heat Regulator.

Temperature regulation, like ventilation, is among the first and most important considerations, not only in hospitals, churches and schoolhouses, but in private dwellings.

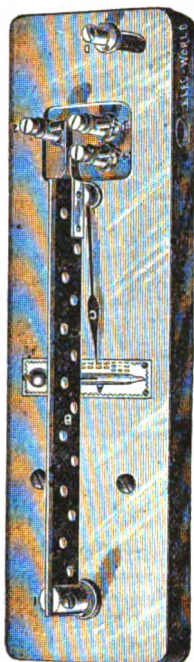


Fig. 1.—Thermostat.

In this climate the severe winters, together with the rapid changes in temperature, make some device by which a uniform temperature can be maintained within doors of the greatest importance, and elec-

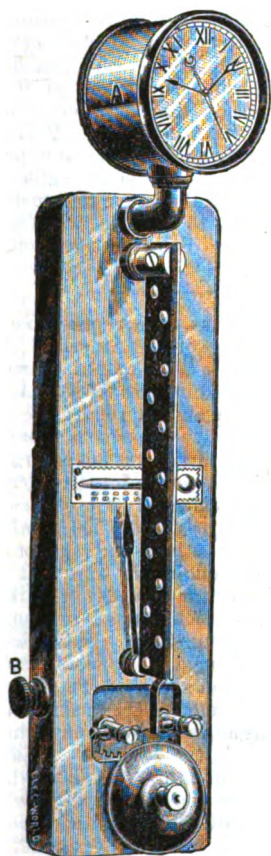


Fig. 2.—Automatic Switch Thermostat.

tricity is eminently adapted to perform the office of heat regulation. For this purpose the well-known thermostat (with such improvements as have been recently made) is employed in combination with other devices which operate to effect the regulation according to its indication.

A system of this nature was recently devised by Mr. A. M. Butz, of A. M. Butz & Co., 154 Lake street, Chicago, and is being now introduced in Boston, New York, Chicago and Minneapolis. This system can be applied to any form of heating device, whether steam, hot water or hot air. It can be applied to the heat source in each room, as on the radiator, register or stove, or to the drafts of the heater or furnace, wherever it may be located, either in the basement or in the barn.

The apparatus consists of a thermostat, Fig. 1, located in the reception hall or sitting-room, which by the influence of the temperature closes an opening and a closing electric circuit at the change of 1°. A motor, Fig. 4, is located in the furnace-room, having sufficient power to open and close a set of balanced dampers, or front and check drafts. There is also a battery, consisting of three cells of sufficient energy, it is said, to run the regulating device for three years without attention or renewal. A bell placed in the servant's room and wires to connect completes the system. As it is desirable in residences to have 5° or 10° lower temperature at night than in the day time, Mr. Butz has patented an automatic switch thermostat, as illustrated in Fig. 2. Before retiring it is determined at what degree the temperature should be set for the night by an adjusting screw, and at what time in the morning it is desired to have the temperature raised to the day temperature by turning alarm hand on the clock to, say, five or six o'clock, at which time it will automatically switch the thermostat from 60° to 70° or any other intermediate degree.

When applied to a steam, hot-water or hot-air heater, the motor is fastened to the furnace and a chain attached to the crank of the motor raises the front draft and closes the check draft, when the temperature falls $\frac{1}{4}$ ° below the desired point

ciated by steam users, as no expensive pneumatic appliances are needed for its operation. Three electric wires and two cells of battery in combination with the thermostat is all that is required to shut off

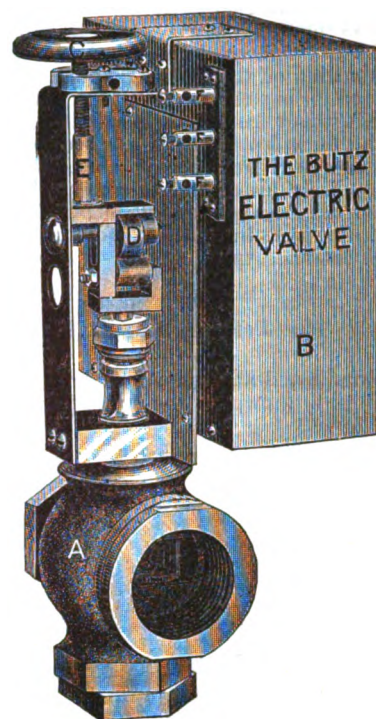


Fig. 3.—Thermo-Electric Valve.

or turn on steam for direct or indirect radiation, and, it is claimed, obtain perfect regulation of temperature in residences, public buildings, hospitals, schoolhouses and conservatories.

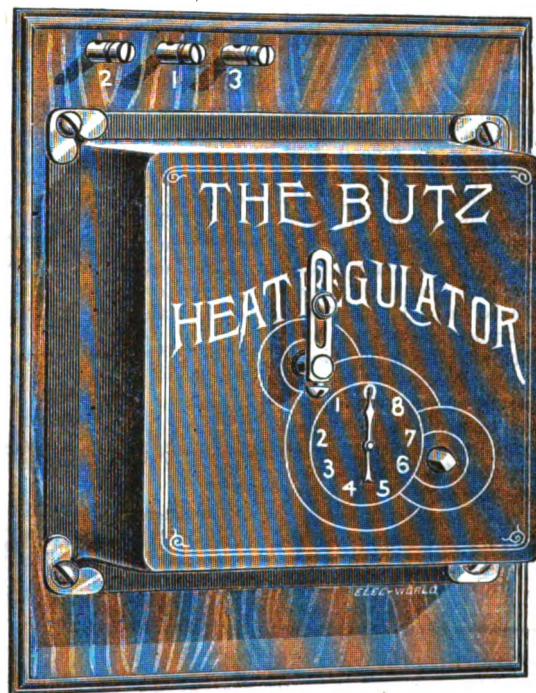


Fig. 4.—Outside View of Motor.

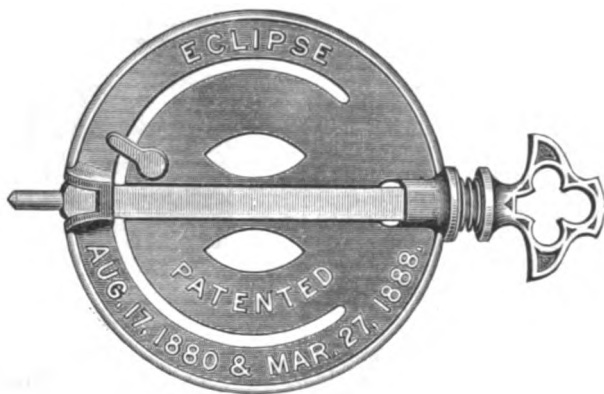
in the room above, and immediately reverses the drafts when the temperature exceeds the desired degree where the thermostat is located. When the temperature falls 2° or 3° below the desired degree, a third circuit is closed on the thermostat on which the bell is located, and this will alarm the attendant to supply coal or shake the ashes down. In Fig. 3 is shown the thermo-electric valve for steam radiators which will be at once appre-

As will be seen in Fig. 3, the valve A can be used as an angle or straight-way valve. The steam enters the chamber surrounding the core in which the double valve seats are held closed by the valve stem E and eccentric D. The upper seat being necessarily a little larger than the lower, the steam pressure helps to hold it the more firmly. When the temperature falls, the "opening circuit" on the thermostat is closed, and the motor B re-

volves the shaft and eccentric D, opening the valve seats and allowing the steam and water to pass in and out freely in case the valve is used on the single pipe system. When the temperature rises above the desired degree and closes the "closing circuit" on the thermostat, the motor again revolves the shaft and eccentric D half a revolution, tightly closing the valve seats and shutting off the steam. Should it be required for any reason to open or close the valve without the aid of electricity, this can be done by loosening a set-screw on the eccentric D and resorting to the wheel C to raise or lower the valve stem. This system has been applied in many of the finest residences in Chicago, and a number of testimonials speak highly of its efficiency.

The Eclipse Damper.

An improved stove-pipe damper, a view of which is shown in the engraving pre-



Improved Eclipse Damper.

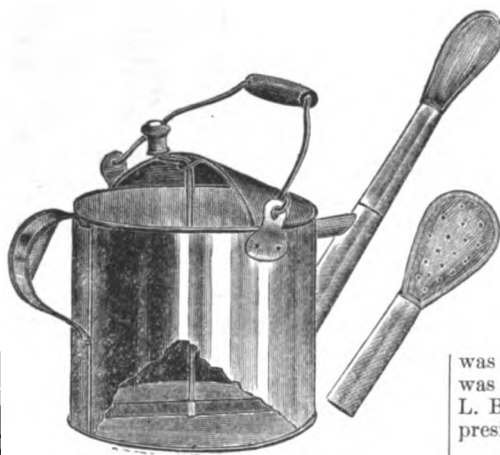
sented herewith, is being placed upon the market by Charles Millar & Son, of Utica, N. Y. The damper plate is made with an elastic tongue, as shown in the engraving, which permits the spindle to be pushed through the pipe and plate, where it is firmly fastened in place by a malleable button. This button is so placed that when the spindle is in position it not only locks all the parts of the damper, but also tends to prevent the warping of the damper plate. A spring acting upon the stove-pipe and against the collar of the handle causes the damper to retain whatever position it may be placed in. The castings constituting the damper are smooth and carefully finished, the handle being nickel plated. The device is claimed to be very convenient, and is meeting with much favor at the hands of the trade. These dampers are packed in neat cases, each containing three dozen of a size, or they are packed in barrels, as may be preferred. In order to take the damper apart it is simply necessary to turn the button shown in the engraving, press the tongue away from the spindle, when it may be easily withdrawn.

It is officially stated that the contracts between the companies interested have been signed, by which the business of the Jersey Central, Lehigh Valley, Lehigh and Hudson and Ontario and Western railroads will pass over the Poughkeepsie Bridge by a short road which is now being built from the western approach to Montgomery, connecting there with the Erie road. The bridge proper will be completed in four weeks, and all the approaches will be complete in three months. The Storm King Bridge is no longer a rival to the Poughkeepsie Bridge, its charter articles of incorporation and all papers owned by it having been bought by the Poughkeepsie Bridge Company over a year

ago. It has been positively affirmed that the New York Central has captured the Poughkeepsie Bridge, thus heading off the plans of the Pennsylvania Road for an invasion of New England territory, but on this subject reports are contradictory.

The Collins Patent Sprinkler.

In the accompanying illustration is shown an improved form of sprinkling pot just being offered the trade by M. P. Kellogg, of Collins, N. Y. The engraving presents a perspective view of the device, with a portion of the side broken away to show the position of the agitator; also a view of the under side of the nozzle. The sprinkler is made of tin, and especially designed for distributing paris green or other insect poison held in solution or suspension in liquids. A feature of the device is the agitator provided for the purpose of thoroughly mixing the powders or poisons



The Collins Patent Sprinkler.

vertical position. The manufacturer claims that the device has proven very satisfactory for the purpose for which it is intended, and that there is no dripping from the nozzle when the sprinkler is not in use.

Combined Stove and Glue-Pot.

The Cline Mfg. Co., of Chicago, Ill., are offering the trade an improved form of glue-pot and stove combined, a view of which is presented in the accompanying engraving. The device consists of a sheet-iron vessel, with cover and bail divided



Combined Stove and Glue Pot.

into two compartments. The lower one constitutes the fire-box, into which charcoal or any other convenient fuel may be placed, while the upper receptacle is designed for the glue to be heated. The makers state that when Cline's patent aromatic composition fuel is employed the fire burns from the top toward the bottom, and that there is no oil, no blaze and no danger, qualities which should render it popular with those having use for such articles. In order to operate the device the makers present the following directions: Remove the glue-pot and the inside fire-box from the stove; then fill the box with fuel, the top of which sprinkle with a few drops of alcohol, or place a loose wad of paper on top of the fuel; set fire to it and let the same remain out of the stove until the blaze is all exhausted, which will only be a few moments. Remove the burnt paper from the fuel and place the fire-box in the stove, then the glue-pot and cover, allowing the stove to remain in the open air about 15 minutes, when it will be fairly started. Stir lightly about every three hours.

About 40 firms were represented at the annual meeting of the American Association of Window Glass manufacturers, held in this city last week. According to the annual report the production of the association for the year, while large, was not as large as that of last year. Imports were larger than those of last year. During the year about 1300 pots had been in operation, and the production had amounted to about 500,000 boxes for 40 weeks of work. There was stock enough on hand to last for some time. Indications were that next year would see an increased supply. There were over 8500 men in the business and their organization was one of the strongest in the country. Skilled labor was paid from \$3 to \$8 a day, while more was paid for special kinds of work. F. L. Bodine, of Philadelphia, was elected president.

J. H. Lippincott confirms the report that he has purchased all the right in America to Thomas Edison's phonograph. He does not name the exact sum paid for the invention, but it exceeds \$1,000,000. He says that the phonographs are ready for commercial use, and will be on the market before many days. Mr. Edison still owns the foreign patents to the invention.

Hog Rings and Kissers.	
Smith's Improved Kissers.....	7 doz \$4.80
Smith's Improved Kissers.....	7 doz \$3.00
Smith's Tonges.....	7 doz \$3.00
Smith's Rings.....	7 doz boxes \$2.95 & 2.40
Perfect Rings.....	7 doz boxes \$1.75 & 2.00
Smith's Hog Rings.....	7 doz \$2.64
Smith's Hog Rings.....	7 doz \$2.64
Smith's Hog Rings.....	7 doz \$2.64
Champion Rings.....	7 doz \$2.00
Champion Rings Double.....	7 doz \$2.50
Double Rings.....	7 doz \$2.50
Crow's Rings.....	7 doz \$1.25 & 1.50

Kneels.....		56c 25.
Door Mineral.....		75c 79 1/2
Door Por. Jar'd.....		75c 79 1/2
Door Por. Por. Nickel.....	\$2.00	@ 1.25
Door Por. Plated, Nickel.....	\$2.00	@ 1.25
Crawler, Porcelain.....	dls 55-104-10	@ 1.10 & 1.10
Embossed Door Knob, new list.....	dls 40-100-10	@ 1.10
Embossed Wood Knob, Best Dec., 1885.....	dls 40-100-10	@ 1.10
Marquette Plain.....	75c gross in dls	40-100-10
Marquette, Wood Screws.....	dls 25-10-10	@ 1.10
Ass. Rubber Tip.....	dls 70-100-10	@ 1.10
Secure, Judd's.....	dls 60-10-10 @ 70	1
Secure, Burgess's.....	dls 60-10-10	@ 70 1
Secure, Emmons's.....	dls 60-10-10	@ 70 1
Secure, Jones's.....	dls 60-10-10	@ 70 1
Secure, J. L. Jones's.....	dls 60-10-10	@ 70 1

Listre.
Four-ounce Bottles.....# doz. \$1.75 # gro. \$17. 00

Interprime.....	12	20	32	42
No. 10	2.50	4.00	6.00	15.00
Each.....				

Syracuse Screw-Drive Bts.	dis 30 & 30.25
Screw Driver Bts.	dis 50 & 75
Screw Driver Bts. Parry	dis 50 & 75
Fray's Hol. Hds. Sets, No. 3, 112	dis 25 & 25 & 10
P. D. & Co.'s, all Steel	dis 50
Screws	
Wood Screws—List, Brass, Jan. 27; Iron, July 1, 1887	
Flat Head Iron	dis 10
Round Head Iron	dis 10
Flat Head Brass	dis 65
Round Head Brass	dis 65
Flat Head Bronze	dis 65
Round Head Bronze	dis 65
Flat Head, Iron	dis 55
Round Head, Iron	dis 55
Beach and Beach	dis 55 & 10 @ 55 & 10 & 10
Beach, Wood, Beach	dis 55 & 10 @ 55 & 10 & 10
Beach, Wood, Hickory	dis 55 & 10 @ 55 & 10 & 10
Beach, Wood	dis 55 & 10 @ 55 & 10 & 10
Las, Blunt Point	dis 75 @ 75 & 10
Cosens and Las, Blunt Point	dis 55 & 10 @ 55 & 10 & 10
Beach	dis 55 & 10 @ 55 & 10 & 10
Hand Rail, Barget's	dis 75 @ 75 & 10
Hand Rail, Humason, Beckley & Co.'s	dis 70 & 10 @ 75 & 10
Hand Rail, Am. Screw Co.	dis 75 @ 75 & 10
Jack Screws, Millers Falls list	dis 50 @ 50 & 10
Jack Screws, P. S. & W.	dis 55 @ 55 & 10
Jack Screws, Barget's	dis 60 & 10 @ 60 & 10 & 10
Jack Screws, Barget's	dis 40 @ 40 & 10
Scroll Saws	
Leister, complete, \$10.00	dis 35
Bovera, complete, \$4.00	dis 35
Meyne Smiths	dis 60 & 10
Shears	
American (Cast) Iron	dis 75 & 10 @ 75 & 10 & 10
Pruning	dis 55 & 10 @ 55 & 10 & 10
Harvard's Lamp Trimmers	dis 55 & 10 @ 55 & 10 & 10
Timers	dis 55 & 10 @ 55 & 10 & 10
Seymour's List, Dec. 1887	dis 60 & 10 @ 60 & 10 & 10
Heinrich's List, Dec. 1887	dis 60 & 10 @ 60 & 10 & 10
Heinrich's Tailor's Shears	dis 55 & 10 @ 55 & 10 & 10
First quality, C. S. Trimmers	dis 55 & 10 @ 55 & 10 & 10
Second quality, C. S. Trimmers	dis 55 & 10 @ 55 & 10 & 10
Acme Cast Shears	dis 10 & 10 @ 10 & 10 & 10
Diamond Cast Shears	dis 10 & 10 @ 10 & 10 & 10
Clippers	dis 10 & 10 @ 10 & 10 & 10
Victor Cast Shears	dis 75 & 10 @ 75 & 10 & 10
Howe Bros. & Hulbert, Solid Forged Steel	dis 40
Cleveland Machine Co., Solid Steel Forged	dis 70
Claude Shear, Japanese	dis 70
Claude Shear Co., Nickel, same list	dis 60
Shedding Doors	
M. W. & Co., List Jan. 1, 1887	dis 60 & 10 @ 60 & 10 & 10
R. & E. List, Dec. 1886	dis 60 & 10 @ 60 & 10 & 10
Corbin's list	dis 60 & 10 @ 60 & 10 & 10
Patent Roller, Barget's	dis 60 & 10 @ 60 & 10 & 10
Patent Roller, Barget's	dis 60 & 10 @ 60 & 10 & 10
Russell's Anti-Friction, List Dec. 1886	dis 60 & 10 @ 60 & 10 & 10
Moore's Anti-Friction	dis 60
Shedding Doors	
R. & E. List, Dec. 1886	dis 60 & 10 @ 60 & 10 & 10
Barget's list	dis 60 & 10 @ 60 & 10 & 10
Barget's list	dis 60 & 10 @ 60 & 10 & 10
L. & J. White	dis 60 & 10 @ 60 & 10 & 10
Albion Mfg. Co.	dis 60 & 10 @ 60 & 10 & 10
Shoes, Horse, Mule, &c.	dis 35
Horse	
Burden's, Perkins', Phoenix, at factory	\$4.00
Shoe, List, \$1 per keg to above prices	
Ch. Wrenches	
Ton lots	dis 50
1000 lb lots	dis 50
500 lb lots	dis 50
Shet.—(Eastern prices, 25 off, each, 5 days.)	
Drops, 1/2 bag, 35	dis 35
Drops, 1/2 bag, 30	dis 30
Buck and Chilled, 1/2 bag, 35	dis 35
Buck and Chilled, 1/2 bag, 35	dis 35
Shovel and Spades	
Ames Shovels, Spades, &c., list Nov. 1, 1886	dis 30
Kortz—Jobbers frequently give 5 @ 7 1/2 extra on above	
Griffith's Black Iron	dis 50 & 10 @ 50 & 10 & 10
Griffith's Solid Cast Steel	dis 50 & 10 @ 50 & 10 & 10
Old Colony Sanford Fork & Tool Co.	dis 20
St. Louis Shovel Co.	dis 20 @ 20 & 10
Huey, Hinks & Co.	dis 15 @ 15 & 10
Hubbard & Co.	dis 20 @ 20 & 10
Lehigh Mfg. Co.	dis 50 & 10 @ 50 & 10 & 10
Fayre Portland Cement, list Jan. 1, 1886	dis 30
Remington's (Lowman's) Patent	dis 30 & 10 @ 30 & 10 & 10
Bowland's Black Iron	dis 50 & 10 @ 50 & 10 & 10
Bowland's Steel	dis 50 & 10 @ 50 & 10 & 10
Shovel and Tongs	
Iron Head	dis 60 & 10 @ 60 & 10 & 10
Brass Head	dis 60 & 10 @ 60 & 10 & 10
Skeins, Thimble	
Western list	dis 75 & 10 @ 75 & 10 & 10
Columbus Wrt. Steel list Nov. 1, 1887	dis 20
Colbrookdale Iron Co.	dis 5 & 10 @ 5 & 10 & 10
Utica P. S. T. Skeins	dis 60
Utica Turned and Fitted	dis 65
Sieves	
Buffalo Metallic, S. & Co., new list	dis 50 & 10 @ 50 & 10 & 10
Barley Flour Sifters	dis 35
Smith's Adjustable Sifters	dis 35
Smith's Adjustable Milk Strainer	dis 35
Smith's Adjustable F. & C. Strainer	dis 35
Shoes, Wooden	
Meek 15, Notted, 1/2 bag	dis 35
Meek 20, Notted, 1/2 bag	dis 35
Meek 25, Notted, 1/2 bag	dis 35
Meek 30, Notted, 1/2 bag	dis 35
Meek 35, Notted, 1/2 bag	dis 35
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Meek 645, Notted, 1/2 bag	dis 35
Meek 650, Notted, 1/2 bag	dis 35
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Meek 675, Notted, 1/2 bag	dis 35
Meek 680, Notted, 1/2 bag	dis 35
Meek 685, Notted, 1/2 bag	dis 35
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Meek 695, Notted, 1/2 bag	dis 35
Meek 700, Notted, 1/2 bag	dis 35
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Meek 710, Notted, 1/2 bag	dis 35
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Meek 720, Notted, 1/2 bag	dis 35
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Meek 845, Notted, 1/2 bag	dis 35
Meek 850, Notted, 1/2 bag	dis 35
Meek 855, Notted, 1/2 bag	dis 35
Meek 860, Notted, 1/2 bag	dis 35
Meek 865, Notted, 1/2 bag	dis 35
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Meek 875, Notted, 1/2 bag	dis 35
Meek 880, Notted, 1/2 bag	dis 35
Meek 885, Notted, 1/2 bag	dis 35
Meek 890, Notted, 1/2 bag	dis 35
Meek 895, Notted, 1/2 bag	dis 35
Meek 900, Notted, 1/2 bag	dis 35
Meek 905, Notted, 1/2 bag	dis 35
Meek 910, Notted, 1/2 bag	dis 35
Meek 915, Notted, 1/2 bag	dis 35
Meek 920, Notted, 1/2 bag	dis 35
Meek 925, Notted, 1/2 bag	dis 35
Meek 930, Notted, 1/2 bag	dis 35
Meek 935, Notted, 1/2 bag	dis 35
Meek 940, Notted, 1/2 bag	dis 35
Meek 945, Notted, 1/2 bag	dis 35
Meek 950, Notted, 1/2 bag	dis 35
Meek 955, Notted, 1/2 bag	dis 35
Meek 960, Notted, 1/2 bag	dis 35
Meek 965, Notted, 1/2 bag	dis 35
Meek 970, Notted, 1/2 bag	dis 35
Meek 975, Notted, 1/2 bag	dis 35
Meek 980, Notted, 1/2 bag	dis 35
Meek 985, Notted, 1/2 bag	dis 35
Meek 990, Notted, 1/2 bag	dis 35
Meek 995, Notted, 1/2 bag	dis 35
Meek 1000, Notted, 1/2 bag	dis 35

Holmes & Edwards Silver Co.	dis 50 @ 50 & 10
H. & E. Silver Co., Mexican Silver	dis 50 & 10
H. & E. Silver Co., Durham Silver	dis 50 & 10
German Silver	dis 50 & 10
German Silver, Hall & Elton	dis 50 & 10
Nickel Silver	dis 50 & 10
Britannia	dis 50 & 10
Boardman's Flat Ware	dis 50 & 10
Boardman's Nickel Silver	dis 50 & 10
Boardman's Britannia Spoons, case lots	dis 50 & 10
Spring	dis 50 & 10
Elliptic, Concord, Platform and Half Scroll	dis 50 & 10
Cliff's Bolster Springs	dis 50 & 10
Steel and Iron	dis 50 & 10
Nickel Plate	dis 50 & 10
Try Square and T Bevels	dis 50 & 10
Diastion's Try Square and T Bevels	dis 50 & 10
Winterbottom's Try and Miter	dis 50 & 10
Staples	dis 50 & 10
Fence Staples, Galvanized	dis 50 & 10
Fence Staples, Plain	dis 50 & 10
Steelyards	dis 50 & 10
Steels and Dies	dis 50 & 10
Blacksmith's, Waterford Goods	dis 50 & 10
Lightning Screw Plate	dis 50 & 10
Reese's New Screw Plates	dis 50 & 10
Staples	dis 50 & 10
Hindman No. 1, 3; Axe, 5; Slip No. 1, 5	dis 50 & 10
Band Stone	dis 50 & 10
Washita Stone, Extra	dis 50 & 10
Washita Stone, No. 1	dis 50 & 10
Washita Stone, No. 2	dis 50 & 10
Washita Stone, No. 1 Extra	dis 50 & 10
Washita Stone, No. 2 Extra	dis 50 & 10

THE IRON AGE

THURSDAY, AUGUST 2, 1888.

New Side Crank Engine.

We illustrate on this page a new design of plain slide-valve engine turned out by the W. T. Adams Machine Company, of Corinth, Miss., in sizes of 40, 50, 60, 75 and 100 horse-power.

The bed is cast in one piece, lying close to the foundation its entire length, combining strength and solidity. It is held to the foundation by a double line of anchor bolts. The cylinder is bolted to the end of the bed, as shown. The ports in the valve-seat are very large, being as long as the diameter of the cylinder will allow, so as to get steam into the cylinder, use it and get rid of it in the shortest possible time. The steam-chest is bolted to the side of the cylinder. It is of good length

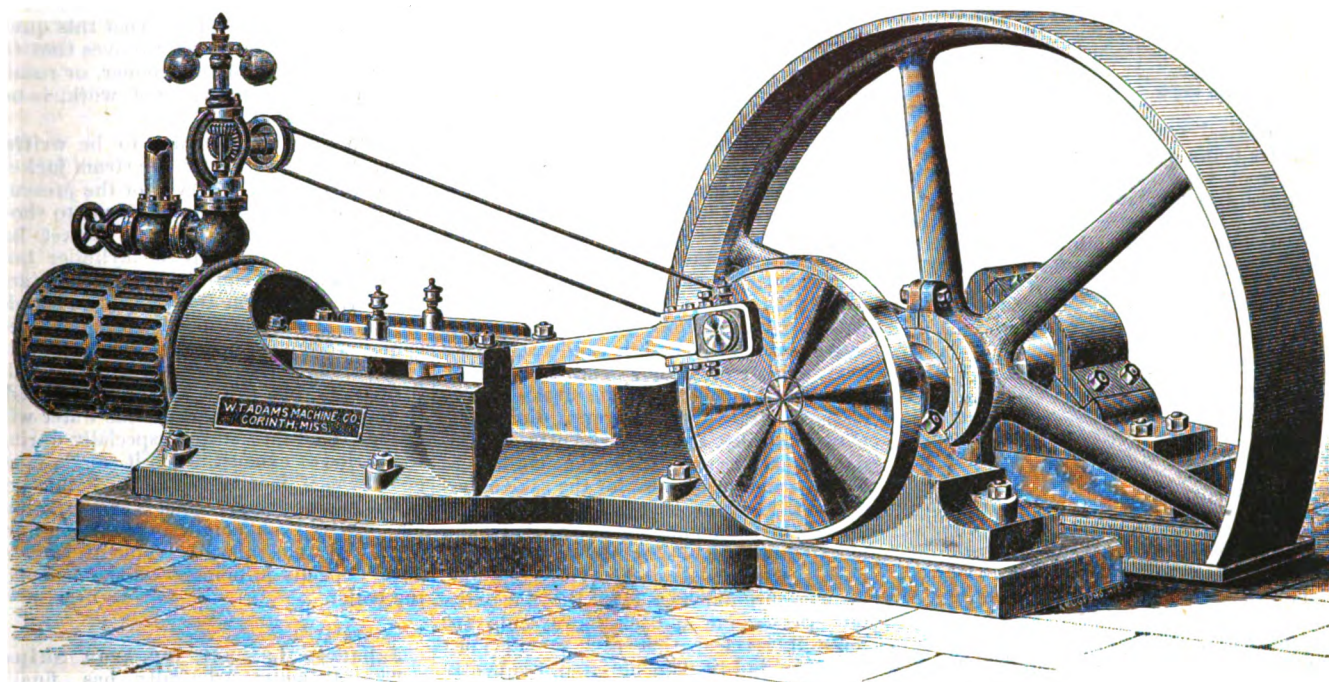
workingman and the State." That was embodied in a resolution expressive of the sense of the Congress upon the subject.

Material for Propeller Blades.

In a paper on "The Material Best Suited for Propeller Blades," recently read before the British Institution of Naval Architects, Mr. W. C. Wallace presented data regarding the strength, durability and cost of propeller blades made from cast iron, steel, gun metal, manganese bronze, phosphor bronze, delta metal, and aluminium bronze.

Until recent years, according to Mr. Wallace, cast iron was the material most generally in use for propeller blades, and is still in favor with some engineers. Its

coating, and thus setting up galvanic action. The present price for finished steel blades is from \$175 to \$200 per ton. Gun metal has been used almost as early as cast iron, but the use was restricted to the Royal Navy and to small private vessels. It has great resistance to corrosion, the life of the blades being in most cases longer than that of the ship; but owing to the galvanic action between the blades on the hull serious pitting would take place in the stern frames and plating if the latter were not protected by placing strips of zinc round the inside of the propeller aperture. The zinc is consumed, but the hull is preserved. The quantity of zinc required for a propeller of 20 feet diameter is about 3 cwt., and must be renewed every 12 or 15 months, at a cost of about \$50. In point



SIDE CRANK ENGINE, BUILT BY THE W. T. ADAMS MACHINE CO., CORINTH, MISS.

and narrow, avoiding long and wasteful steam passages. The cross-head is of the locomotive style, with wide bearing on the guides and is screwed to the piston and secured by a jam-nut. The pillow-block is cast solid to the frame at an angle of 45° and has large and long bearings, lined with anti-friction metal. The crank is counterbalanced, shrunk on the main shaft and secured by a steel key accurately fitted. The wrist-pins of these engines are made so that their diameter exceeds their length in the journal. The overhang of the crank is very much reduced and entire rigidity secured.

Prof. Francis Wayland, whose motion to that effect was adopted by the recent Prison Reform Congress, contends that without productive prison labor the work of prison reform cannot be accomplished. If the prisoner is to be reformed he must have work for his hands to do in which his mind will be interested, or, as the idea is otherwise presented, "that any scheme which has a tendency, direct or indirect, to promote or permit the idleness or unproductive labor of prisoners will inflict irreparable injury upon the prisoner, the

most serious defect is its liability to fracture, and the increase in thickness of the blade necessitated thereby. It is not to be recommended where trustworthiness is a desideratum, but has the advantage of being cheap, of preserving the true form of the screw in casting, and of having a smooth surface. Cast-iron propeller blades require to be renewed every five or six years. The cost of finished blades may be taken as from \$100 to \$120 per ton.

The introduction of mild steel as a material for propeller blades has been a great improvement, rendering them absolutely trustworthy as regards strength, but bringing about the evil of corrosion. The blades become so pitted and broken in a few years that they have to be renewed, and with steel it is not possible, as with cast iron, to burn on new tips. The life of steel blades varies from 3 to 6 years. Many attempts have been made to protect steel blades from becoming pitted by a covering of some other metal. Tin has been applied to the back of the blades near the tip, and brass plates have also been used to cover that portion of the back of the blades which is most subject to corrosion. It is, however, extremely difficult to prevent water from getting behind the

of strength gun metal is only slightly ahead of cast iron, but it is not so brittle. The present price for finished blades is about \$850 per ton.

Manganese bronze, like gun metal, is free from corrosion, but is difficult to cast, and sets up galvanic action, requiring the application of zinc, as already explained. Its price is about \$25 higher than that of gun metal. Phosphor bronze has an ultimate tensile strength of 15.8 tons, and in this respect is not much superior to either gun metal or manganese bronze; but its elongation is 17½ per cent., showing its great ductility. No large propellers have, so far as the author is aware, been made of this metal; but in steam launches and torpedo boats it has been used. The price of finished blades is \$850 per ton. Delta metal, which is an alloy of copper, zinc and iron, and which has a breaking strength of from 15 to 23 tons, with an elongation of from 10 to 20 per cent., has to a limited extent been used for the propellers of sea-going ships; but the author was unable to speak either of its trustworthiness or of its lasting qualities. The price for finished blades was given as \$575 a ton, or five times that of cast iron, and three times that of steel.

Aluminium bronze has up to the present been little used for propellers of any size; but if aluminium brass is all that the advocates of this material claim for it, Mr. Wallace considers it likely that it will be largely used for propellers. An 8½ per cent. aluminium bronze is recommended by one of the officials of the United States Navy for twin screws, but the high price of \$1175 per ton for finished blades renders its adoption in the merchant navy almost impossible. The following table contains a summary of the strength and elongation of the various materials above enumerated:

	Ultimate tensile strength. Tons per square inch.	Elongation. Per cent.	Weight to break bar 1 in. by 1 in., 12 in. be- tween supports. Cwts.
Cast iron.....	10	.....	18
Steel.....	31	10	55
Gun metal.....	14	9	33
Manganese bronze.....	15	.....	28
Manganese bronze (by Bronze and Brass Co.).....	.....	.....	45
Phosphor bronze (by Phosphor Bronze Co.).....	16	17	24
Delta metal.....	19	15	.....
Aluminium brass.....	34	2	.....

Practical experience has led to steel blades being made 25 per cent. thinner at the root than cast iron, while for manganese bronze and aluminium brass an allowance of 30 per cent. may be assumed. Delta metal may be allowed 25 per cent. reduction, and gun metal and phosphor bronze each a reduction of 10 per cent. Making these allowances, the relative cost of blades compared with cast iron is as follows:

	Cost per ton.	Equivalent cost of blades for every ton of cast iron blades.
Cast iron.....	£24	£24
Steel.....	38	33
Gun metal.....	130	144
Manganese bronze.....	135	123
Phosphor bronze.....	170	153
Delta metal.....	115	110
Aluminium bronze.....	145	139

The relative first cost is, however, not the only item of expenditure which must be considered. Shipowners must remember that the renewal of blades and the difference in power consumed are also important matters.

The Operation of the Steam Jacket.

In a recent article on "The Theory of the Steam Engine," the London *Engineer* refers as follows to the mode of operation of the steam jacket:

It is a very crude statement that it does good because it keeps the cylinder hot. It might keep the cylinder hot and yet be a source of loss rather than gain; and, as a matter of fact, it is doubtful now if the application of steam jackets to all the cylinders of a compound engine is advisable. It is well known, too, that circumstances may arise under which the jacket is powerless for good. Thus, for example, the late Mr. Alfred Barrett, when manager of the Reading Ironworks, carried out a very interesting series of experiments with a horizontal engine, in order to test the value of the jacket. This engine had a single cylinder fitted with a very thin wrought-iron liner, between which and the cylinder was the jacket space. The jacket was very carefully drained, and could be used either with steam or air in it. Experiments were made on the brake with and without steam in the jacket. They were repeated alternately, the conditions being in all respects similar to those obtaining during competitive trials by the Royal Agricultural Society. The result

was a practically infinitesimal gain by using steam in the jacket. In one word, the loss by condensation was transferred from the cylinder to the jacket. On the other hand, it is well known that single-cylinder condensing engines must be steam jacketed if they are to be fairly economical. Circumstances alter cases, and the circumstances which attend the use of jackets are more complex than appears at first sight.

In considering the nature of the work to be done, we must repeat a fundamental truth which we have been the first to enunciate. A steam engine can discharge no water from it which it did not receive as water, save the small quantity which results from loss by external radiation and conduction from the cylinder and from the performance of work. At first sight the proposition looks as though it were untrue. Its accuracy, will, however, become clear when it is carefully considered. After the engine has become fully warmed up the cycle of events is this: Steam is admitted to the cylinder from the boiler. A portion of this is condensed. It parts with its heat to the metal with which it is in contact. The piston makes its stroke and the pressure falls. The water mixed with the steam is then too hot for the pressure. It boils and produces steam, raising the toe of the diagram in a way well understood and needing no explanation here. During the return stroke the pressure falls to its lowest point, and the water, being again too hot for the pressure, boils and is converted into steam, which escapes to the atmosphere or condenser without doing work and is wasted. The metal of the cylinder, &c., falls to the same temperature as the water. At the next stroke the entering steam finds cool metal to come into contact with, and is condensed as we have said, and so on. But the quantity condensed during the steam stroke is precisely equal to that evaporated during the exhaust stroke, and consequently no condensed steam can leave the engine as water. Let us suppose for the sake of argument, however, that an engine using 20 pounds of 100-pound steam per horse per hour discharges 2 pounds of water per horse per hour. As each of these brought, in round numbers, 1185 thermal units into the engine and takes away only 212 units, it is clear that each pound must leave behind it 973 units; consequently the cylinder will be hotter at the end of each revolution than it was at the beginning, and the process would go on until condensation must entirely cease.

It will be urged, however, that a steam jacket certainly does discharge water, and that in considerable quantity, which it did not receive; and as this is apparently indisputable, we are here face to face with one of the puzzles to which we have referred. The fact, however, is in no wise inconsistent with what we have advanced. If an engine with an unjacketed cylinder regularly receives water from the boiler that engine will discharge precisely an equal weight of water. The liquid will pass away in suspension in the exhaust steam. The engine has no power whatever of converting it into steam. The case of a jacketed engine is different. Such an engine will evaporate in the cylinder water received with the steam, but it can only do so at the expense of the steam contained in the jacket. For every 1 pound of water boiled away in the cylinder 1 pound of steam is condensed in the jacket, and the corollary is that if an engine was supplied with perfectly dry steam there would be no steam condensed in the jacket, save that required to meet the loss due to radiation and the conversion of heat into work. The effect of the jacket will be to boil a portion of the water during the close of the stroke, and so to keep up the toe of the diagram, and so to get more

work out of the steam. If, however, the steam was delivered wet to the engine it is very doubtful if the jacket could be productive of much economy. The water would be converted into steam during the exhaust stroke, and no equivalent would be obtained for the steam lost in the jacket.

In a good condensing engine about 3 pounds of steam per horse per hour are condensed in the jacket. The cylinder will use, say, 15 pounds of steam, so that the total consumption is 18 pounds per horse per hour. It is none the less a fact, although it is not generally known, that the average Lancashire boiler sends over about 8 per cent. of water in the form of insensible priming with the steam. Now, 8 per cent. of 18 pounds is 1.44 pounds, so that in this way we have nearly one-half the jacket condensation accounted for, as just explained. One horse-power represents 2562 thermal units expended per hour, or say 2.6 pounds of steam of 100 pounds pressure condensed to less than atmospheric pressure; and $1.44 + 2.60 = 4.04$ pounds per horse per hour, as the necessary jacket condensation if no water is to be found in the working cylinder at the end of each stroke. That this quantity is not condensed only proves that the water received from the boiler, or resulting from the performance of work, is not all re-evaporated.

Something still remains to be written about the true action of the steam jacket, but this we must reserve for the present. We have said enough, we think, to show that, as we have stated, the jacket has more to do than keep the cylinder hot. With jacketed engines more than any others it is essential that the steam should be dry. In the case of an unjacketed engine water supplied from the boiler will pass through the engine as water and do little harm, but if the engine is jacketed, then the whole or a part of this water will be converted into steam, especially during the period of exhaust, when it can do more good than if it were boiled away in a pot in the engine-room. This is the principal reason why such conflicting opinions are expressed concerning the value of jackets. That depends principally on the merits of the boiler.

Japanese Lacquer for Iron Ships.

—The Japanese Admiralty has finally decided upon coating the bottoms of all their ships with a material closely akin to the lacquer to which we are so much accustomed as a specialty of Japanese furniture work. Although the preparation differs somewhat from that commonly known as Japanese lacquer, the base of it is the same—viz, gum-lac, as it is commonly termed. Experiments, which have been long continued by the Imperial Naval Department, have resulted in affording proof that the new coating material remains fully efficient for three years, and the report on the subject demonstrates that, although the first cost of the material is three times the amount of that hitherto employed, the number of dockings required will be reduced by its use to the proportion of one to six. A vessel of the Russian Pacific fleet has already been coated with the new preparation, which, the authorities say, completely withstands the fouling influences so common in tropical waters. It occupied the native inventor for many years to overcome the tendency of the lac to harden and crack, but having successfully accomplished this, the finely polished surface of the mixture resists in an almost perfect degree the liability of barnacles to adhere or weeds to grow, while presumably the same high polish must materially reduce the skin friction which is so important an element affecting the speed of iron ships. The dealers in gum-lac express the fear lest

the demand likely to follow on this novel application of it may rapidly exhaust existing sources of supply.

Swedish Bar Iron and the English Merchandise Act.

Some recent decisions by the English customs authorities respecting the marking of Swedish bar iron in accordance with the Merchandise Marks act are said to be causing great alarm among Swedish iron manufacturers, and to have led to diplomatic negotiations between the English and Swedish Governments. As is generally known, a large quantity of Swedish bar iron imported into this country bears the words "Lancashire-Swedish," or "Lancash-Swedish," which designation has hitherto obtained for it a free entry. Now, however, the English custom authorities, guided by the provisions of the new act, have decided that, unless the bars in addition bear the words "manufactured in Sweden," or "produced in Sweden," all such imports will be forfeited to the British Crown. This has given rise to great excitement, and even indignation, in Sweden, as it is considered that we are treating Swedish iron with undue severity, and that, considering the benefit the English iron industry derives from the imports of Swedish bar iron, and its re-export in the finished state, the trade should be rendered every facility. The Swedish minister in London is said to have received instructions to urge upon the English Government the advisability of relaxing the severity of this clause in the act in favor of Swedish-Lancashire iron. An adverse decision would, it is urged by those interested in the trade, be very serious, as there are large stocks of bar iron on hand in Sweden with the old brand. Several Swedish journals also take the opportunity of pointing out that, according to the new law, it is forbidden—under pain of forfeiture—to import into England, as has hitherto been done, Swedish made iron bearing the name or brand of some English manufacturer or dealer, even if affixed at the request of the firm in question, and even if accompanied by a written certificate to that effect.

London *Iron* says: "We trust the English Government will not allow itself to be persuaded to relax the due administration of the provisions of the Merchandise Marks act in the least, either in the case of Sweden or any other country, for the act is doing immense good to English industry. As to the request of the Swedish Government said to have been addressed to our Government, it seems rather a cool proceeding on the part of Sweden, after the passing by its legislature of a highly protective tariff, to ask for consideration. It is an unblushing proceeding, and the sooner Swedish manufacturers and exporters, and the Swedish public generally, are made to see the matter in its true light, the better for the amicable relations of the two countries."

The Steamer Puritan.—The launch of the side-wheel steamer Puritan, at Chester, Pa., July 25, was attended by a number of distinguished builders and engineers. The Puritan, a sister ship to the Pilgrim, built at the same yards six years ago, is 420 feet over all, 404 feet on the waterline, 52 feet beam, 91 feet breadth above guards, 20½ feet hold, 63 feet height of dome from floor and draft of water 12 feet; gross tonnage, 4650 tons; estimated displacement, 4200 tons. She will be propelled by compound beam engines. The low-pressure cylinder will be 110 inches in diameter, 14 feet stroke, and the high-pressure one will be 75 inches in diameter and 9 feet stroke. There will be eight steel return tubular boilers averaging 7500

horse-power. The vessel is expected to develop a speed of 21 miles per hour. Her hull is of steel, built on the longitudinal and bracket plate system of naval architecture. She has 56 water-tight compartments and six water-tight bulkheads. Her main deck is of steel and she is unsinkable and fire-proof. Her saloon and stateroom accommodations will be superbly finished in the choicest woods and finest upholstery and she will have 110 more staterooms than the Pilgrim. Her steering-gear is worked by steam. The gullows-frame for the walking-beam is constructed of steel and iron and weighs 35 tons. Nothing in the way of American inventive genius that money can procure will be lacking in this handsome vessel to afford safety to passengers. Her cost will be \$1,500,000. She will be ready some time next season to take her place on the line from New York to Fall River. She will receive her boilers and machinery in this city.

Natural Gas Suit.

A very important suit to all natural gas consumers, and which will result in the determining the power of the courts in the matter of fixing the rates for natural gas, was commenced in the courts at Pittsburgh on Friday the 20th ult. It is in the form of a bill in equity, filed by the Faraday Carbon Company against the Philadelphia Natural Gas Company. The Faraday Carbon Company are engaged in the manufacture of carbon points for electric lights, and operate large works in the above-named city. The bill alleges, first, that the Philadelphia Company are common carriers, and as such exercise the right of eminent domain and have obtained great privileges from the Pittsburgh City Councils. It is further asserted that the Philadelphia Company have entered into a fraudulent and illegal combination with the Pennsylvania and the Chartiers Natural Gas Companies for the purpose of increasing the price of natural gas furnished to the public, and by reason of this combination the plaintiffs can at present only obtain a supply from the Philadelphia Company.

The plaintiffs were notified last June by the officials of the Philadelphia Company that the price of gas was to be largely increased, and a new contract would have to be signed. The plaintiffs thereupon determined to abandon the use of gas as fuel under their boilers, but to continue it for their heating furnaces, ovens and other machinery. This the Philadelphia Company refused to permit, and insisted that if any gas at all was furnished it would have to be used in all the operations of the factory. The price asked for the gas was equal to about 9 cents per 1000 feet, while, it is alleged, other persons are being supplied at rates ranging from 3 to 5 cents per 1000 feet. The plaintiffs offered to pay a reasonable price, but it was refused, and they were notified that the gas would be shut off from the factory unless the new contract was signed at once. The Faraday Carbon Company assert that if the gas is cut off, as threatened, they will suffer great loss, and therefore wish the Court to intervene. The Court is asked to grant an injunction to restrain the Philadelphia Company from cutting off the supply of natural gas; to fix a reasonable price at which the gas shall be furnished, and to set aside as void the combination between the Philadelphia, Pennsylvania and Chartiers Companies.

The Louisville and Nashville Railroad Company advertised for bids for 500 freight cars a few days ago, and bids were received from 11 car-building companies, the figures ranging from 5 per cent. to 10 per cent. lower than last year's prices.

New Coke Furnace at Mayville, Wis.

The blast furnace at Mayville, Dodge County, Wis., is now in successful operation, having been blown in on the 1st ult. It is practically a new furnace, although it consists in part of the charcoal furnace long operated by the Northwestern Iron Company, of Milwaukee. The local ore, to smelt which this furnace was originally built, is a fossil ore, similar in many respects to the Clinton ore of New York, but it decrepitates very easily, and being found usually in small detached pieces it is locally known as flaxseed ore. Owing to its fineness it had been found somewhat difficult to handle in the old furnace, which therefore ran but irregularly. The deposit is so immense, however, that the owners desired to turn it to more profitable account, and, consulting with the well-known engineer, John Birkinbine, of Philadelphia, they concluded to take his advice and remodel their furnace to use coke. The work of reconstruction was put in his hands, and his ideas were embodied throughout.

The dimensions of this furnace now are 65 feet high and 13½ feet diameter at back. The old boilers were retained, and two batteries of new boilers were added, each consisting of two upper boilers, 44 inches in diameter and 60 feet long, with two 14-inch flues and two lower boilers, 38 inches in diameter and 26 feet long. The hot-blast apparatus consists of two 24-pipe Weimer suspended stoves. A Weimer blowing engine having a blowing cylinder, 6 feet in diameter, with a 4-foot stroke, supplies the blast. A Crane hoist elevates the stock by an inclined plane to the tunnel head. The fuel used is exclusively Connellsville coke. Limestone is obtained in the immediate vicinity of the ore beds. The ore now used consists of about 50 per cent. of the local fossil ore and 50 per cent. Lake Superior ore. The local ore is mined very cheaply, being shoveled from the bed into the cars, and is very clean, requiring no preparation for the furnace, and works well with Lake Superior ore in making a good foundry pig iron at low cost. The furnace is located within such a convenient distance of the soft ores of the Menominee and Gogebic ranges that their use in connection with the local ore will enable the furnace company to make a variety of pig iron to suit the demands of the market.

The furnace is now yielding about 50 tons of pig iron daily, but it is not yet working up to its capacity, as the owners are experimenting on mixtures and have, therefore, been obliged to proceed carefully, watching the result of every change. An increase of 20 per cent. in this production is expected soon and much better results are predicted when perfect smoothness of operations is secured. A large output of pig iron is, however, not the only result aimed at. The local fossil ore is an ideal basic ore containing the proper contents of phosphorus and silica for the manufacture of basic pig iron. The opportunity will exist in operating this furnace to demonstrate whether the ore can be easily and profitably smelted for the manufacture of basic steel. The owners have strong faith in the ultimate value of their ore property and propose to ascertain what it is really worth for metallurgical purposes generally.

The furnace will be known as the Mayville Furnace and the pig iron will be marketed as the Mayville brand. Pickands, Brown & Co., 115 Dearborn street, Chicago, are exclusive sales agents. The Spring Lake Iron Company, of Milwaukee, are operating the furnace as lessees from the Northwestern Iron Company. I. M. Bean is president of the company and H. S. Fleming is superintendent of the furnace.

The Tabor Sand Molding Machine.

Sand molding machines for general foundry work have become recognized as labor-saving devices of no small importance, and every new and tried design of this class is therefore of interest. We take pleasure, accordingly, in giving on this page and the one opposite illustrations of the Tabor machine, built by the Tabor Mfg. Company, 111 Liberty street, New York.

It has always been customary for the molder to pack the sand around the pattern with a hand rammer. This gives him a chance to anticipate the varying depths of the pattern, and to ram more or less as the

and any number of castings made from such molds will have a uniform weight and will be true to the pattern. The value of this exact duplication is two-fold and cannot be overestimated; it means economy in material and a large saving in labor if castings are to be fitted or finished.

In the Tabor machine the pressure exerted on a mold is not affected by the amount of sand in the flask—for instance, if more sand than is required be used, the mold will not be harder nor will it be softer if less sand be used, as in either case the downward motion of the rammers ceases when the resistance of the sand equals the pressure on the piston. It is only necessary to see that enough surplus sand is

ward projecting lugs in contact with reverse projections on the pattern frame in the truck, thus relieving the truck and its outside framing of all strains due to the pressure of ramming and insuring the pattern being forced into the sand its full depth. The upper ends of the strain-bars pass between flanges on the sides of the cylinder and are secured by steel pins. Through the upper ends of the bars and the cylinder-flanges are a number of holes for raising or lowering the cylinder to suit the different depths of flasks.

The operation of molding is as follows: The pattern being set, one-half the flask (cope or nowel) is put on the plate, joint-side down. On top of the flask is placed

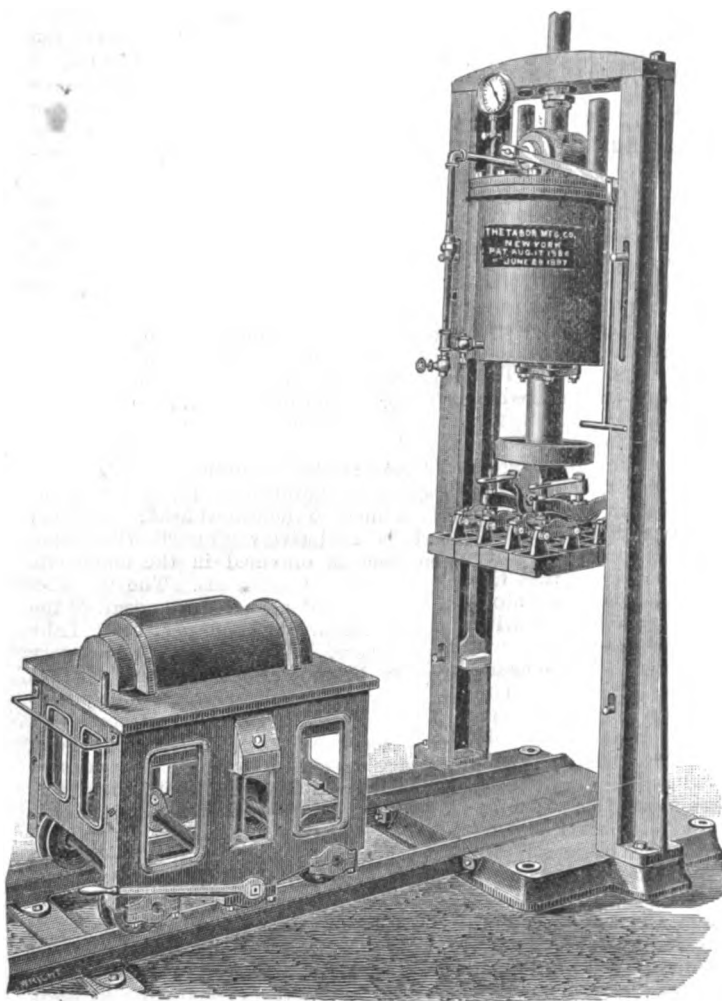


Fig. 1.—Ready for Flask.

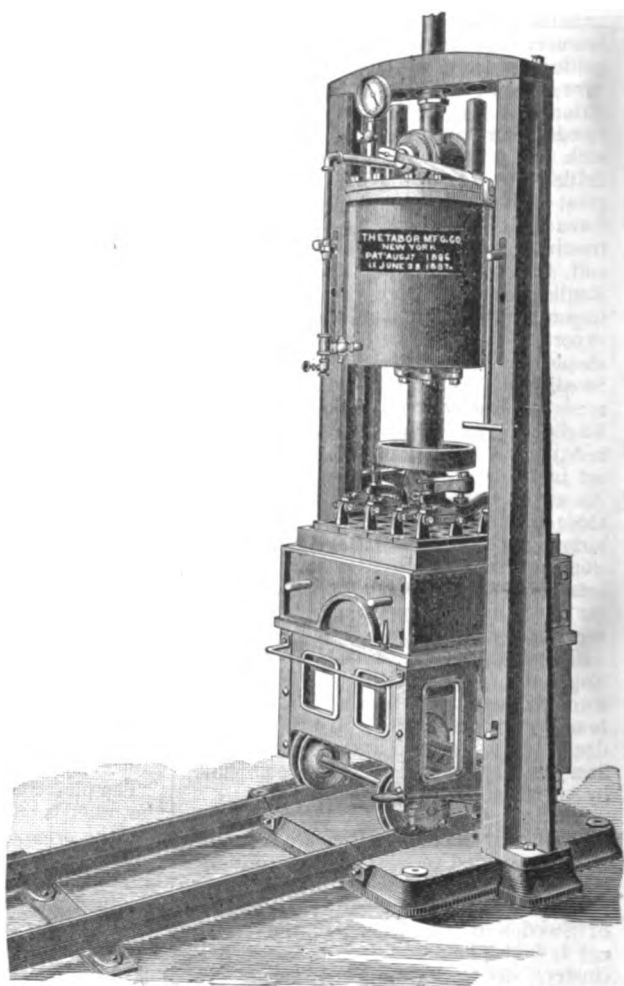


Fig. 2.—Flask Under, Ready for Ramming.

NEW SAND MOLDING MACHINE, MADE BY THE TABOR MFG. CO., NEW YORK.

depth of the sand requires, so as to get a mold uniform in density around the pattern. This is simply a question of judgment with him, which is sometimes good, but frequently bad. In fact, he may ram the mold so hard that the gases cannot escape in pouring, and the casting will "blow;" and at other times make the mold so soft that the casting will "strain," in either case making bad work. The molder draws his pattern by hand, and should the pattern have considerable depth, with little draft, it will be necessary to rap it sufficiently to loosen it so that it may be drawn without breaking the mold. This is objectionable, as more rapping in one case than another makes the mold larger, and consequently the casting is heavier, thus wasting iron. It necessarily follows that if the molds are rammed with equal pressure, and the pattern drawn from the sand without rapping, each mold will be a perfect duplicate of the other,

used to allow for the compression, which means simply to fill the sand box. When the machine rams a mold all the sand in the flask is pressed down in one unbroken body, packing the sand uniformly and leaving the mold, it is claimed, more porous than when made by hand, and venting is therefore required.

The machine consists of a base with extending tracks for a truck or carriage and upright columns, between which is an inverted cylinder. Into this cylinder is fitted a piston and rod, the lower end of which is provided with a group of rammers or pressers. A pair of strain bars are, moreover, provided, which, when ramming, relieve the uprights, and there is, finally, a movable truck on which the pattern and flask are placed. The strain-bars are supported by steel pins, which pass through slotted holes in the lower ends of columns. These slotted holes allow the bars to lift and bring their in-

a sand-box of sufficient depth to hold the surplus sand used in compression. The flask and sand-box are then filled with sand from a hopper overhead (or it may be shoveled in by hand); the truck is run under the machine, steam turned into the cylinder above the piston and the rammers or pressers are forced downward on the sand. When the rammers cease their downward movement the sand is thoroughly and uniformly packed; the steam is then exhausted from the upper side of the piston and admitted to the under side and the hammers raised to their former position; the truck is withdrawn from under the machine, the sand-box removed, the top of the flask "struck off" and the pattern drawn downward from the mold through the stripping-plate, or drawn by hand in the usual way if no stripping-plate be used. One-half of the mold is now finished and ready to go on the floor. The operation will be more clearly un-

derstood by examining Figs. 3 and 4. In these the following references are used: A, pattern; B, pattern-plate; C, stripping-plate; D, cross-head or pattern frame for drawing pattern; E, stool or column for holding up sand; F, cranks. When the pattern is to be drawn by hand, a plane-plate is used on top of the machine, on which is placed the pattern, or follow-board and flask.

The group of rammers is made in size to suit the flask for which the machine is intended. These rammers are so arranged on equalizing levers that each rammer receives its share of the pressure and has a movement independent of the others, so that over a pattern where the sand is deeper under one rammer than under another, the one over the greatest depth of sand may go down until the mold is uniformly packed. On account of the friction of the sand on the sides of the flask, the marginal rammers are attached to the shorter ends of the levers, so that they may get an increased pressure equal

per day will, under unfavorable circumstances, equal the work of four molders, and under favorable conditions the product will equal the work of double that number. Two more men with an extra truck, working on the opposite side of the machine, will double the capacity.

The machine is now in use at the works of the following firms: The Pond Machine Tool Company, Plainfield, N. J.; B. W. Payne & Sons, Elmira, N. Y.; the Union Switch and Signal Company Swissvale, Pa.; the Cooke Locomotive Works, Paterson, N. J.; the Solid Steel Company, Alliance, Ohio, and Westinghouse Air Brake Company, Pittsburgh, Pa.

Surface Condenser Calculations.

In the paper on "Surface Condensers," presented at the recent Nashville meeting of the Society of Mechanical Engineers and briefly referred to in our report at the time, Prof. J. M. Whitham, the author,

a decrease of 10 per cent. will suffice in Arctic waters.*

Professor Marks† gives the formula:
Condensing surface in square feet =

$$\frac{W(H - T)}{0.1 \text{ to } 0.2 C(T - T')}$$

Where W = pounds of steam sent to the condenser per hour.

H = total heat units in 1 pound of steam at the boiler.

T = mean temperature of the circulating water.

T' = temperature of the vacuum.

C = 556.832 for brass and 642.543 for copper tubes, as found by Isherwood, and shown in the table of § 4.

Professor Whitham, in passing on to a formula which he proposes, remarks that the area of the condensing surface depends upon the quantity, quality and temperature of the exhaust steam, the initial and final temperatures of the circulating water, the character of the exposed surfaces and

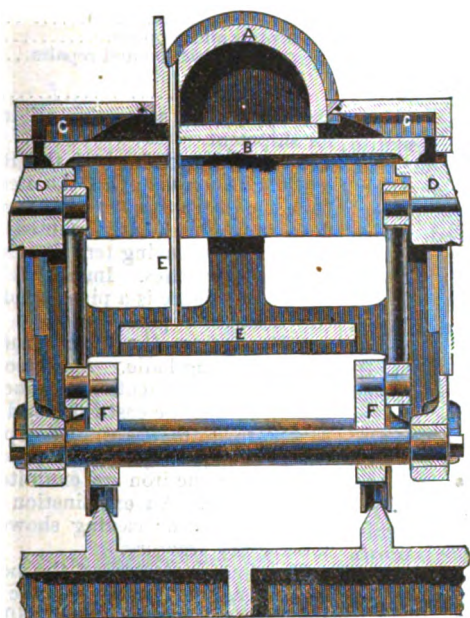


Fig. 3.—Section through Pattern, Ready for Flask.

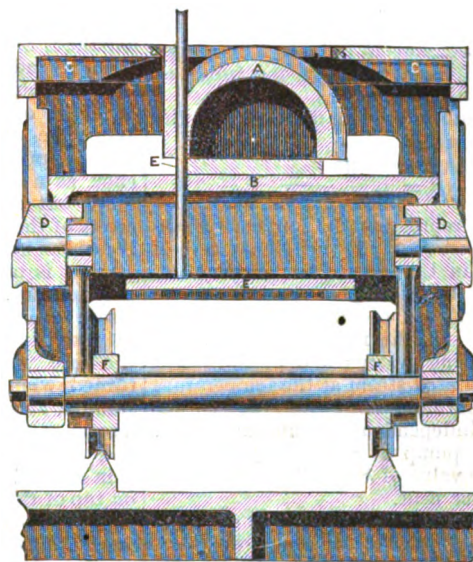


Fig. 4.—Section Showing Pattern Drawn through Stripping Plate.

NEW SAND MOLDING MACHINE, MADE BY THE TABOR MFG. CO., NEW YORK.

to the friction, and prevent the molds from dropping when the flask is handled. The piston has sufficient stroke to allow for a change of 3 inches in the depth of cope or nowel without changing the position of the cylinder. A pan surrounds the piston-rod just above the rammers, which catches any drip from steam or water that may come from careless packing of the stuffing-box; this prevents any wetting of the sand.

It is recommended that a sand conveyer, elevator and riddle for handling the sand be used. The conveyer running through the center of the floor carries the sand to an elevator, which raises it to the riddle, through which it passes into the hopper over the truck; from the hopper it is dropped into the flask as required. Sand handled in this way is thoroughly broken up and evenly tempered. While the sand elevator is an important factor in the economy of the system of molding, it is not a necessity. The machine can be used very profitably without it. Any pressure medium, such as water or compressed air can be used in the rammer cylinder, but steam, for several reasons, is considered preferable. As to the output of the machine we are told that with one truck and two men the amount of work turned out

gave attention to several methods used in calculating condensing surface.

Among them he referred to the following formula by Rigg, in his work on "The Steam Engine": Condensing surface in square feet =

Pounds of steam condensed per hour

8.93 to 7.81

This formula permits about 8000 British heat units to be transmitted through a square foot of condensing surface per hour and assumes that about 1000 units are given up by each pound of steam condensed.

Seaton* gives the following proportions, when the circulating water enters the condenser at a temperature of 80° F.: (I. Absolute terminal pressure of steam in the condensing cylinder. II. Square feet of condensing surface per indicated horsepower),

I.....	6	8	10	12.5	15	20	30
II.....	1.50	1.60	1.80	2.00	2.25	2.50	3.00

When the vessel is to cruise in the tropics the values given in the table must be increased 20 per cent.; when she occasionally visits the tropics, 10 per cent.; while

* Manual of Marine Engineering, by A. E. Seaton, p. 198.

the metal used. The methods given by Rigg and Seaton do not cover all the requirements. Professor Marks's rule is not exact, because the heat given up by the steam to the circulating water is not nearly so great as $W(H - T)$, and because the wide range in the value given to the thermal conductivity of the metal—i. e., from 0.1 to 0.2 C. is misleading.

In studying the action of the surface condenser, Professor Whitham makes the following assumptions, as warranted by the experiments given in §§ 3, 4 and 5, viz.:

1. The temperature of the steam side of the tube is uniform throughout its length (Joule), and the steam is saturated at a temperature corresponding to the reading of the vacuum gauge. This latter assumption, though arbitrary, is probably suffi-

* P. A. Engineer John A. Tobin, U. S. Navy, in his report on the "Improvements in Naval Engineering in Great Britain" (Ex. Doc. 48, Forty-seventh Congress), gives "The proportion of condensing surface to the horsepower in 15 of the most recent (1883) types of high-speed merchant steamers by the best Scotch builders averaged 1.86 to 1. This proportion compared with the data of seven steamers, taken from a paper read before the Institution of Mechanical Engineers by Sir F. J. Bramwell in 1872, having a ratio of 3.18 to 1, shows the saving effected in this direction during the past ten years.

† § 86, Marks's "The Steam Engine," 1887.

ciently exact, since (a) the fluctuations of the reading of the guage are inappreciable; (b) the exhaust port is opened and closed gradually, steam is exhausted throughout all or nearly all of the stroke of the piston, and the steam is condensed as soon as it arrives in the condenser; (c) the steam in the cylinder, at the end of its expansion, is almost certain to be wet, even with steam-jackets, and this wet steam, on account of free expansion during the exhaustion, is saturated when it reaches the condensing surface. This is still further probable because the condenser pressure is always several pounds below the terminal pressure in the condensing cylinder.

2. The temperature of the water side of the tube has a value equal to the arithmetic mean between the initial and final temperatures of the circulating water.

3. The conductivity of the surface is increased as the quantity of circulating water used is increased. This quantity of water will vary inversely as its rise in temperature.

4. The number of heat units transmitted per hour through a unit surface depends directly upon the difference between the temperature of the sides; varies with the material used, and is independent of the thickness of metal used for the tubes, as found in ordinary practice.

The formula which he deduces is of the following form :

$$S = \frac{W L}{180(T - t)},$$

in which S represents the condensing surface in square feet; T , the temperature of the steam in the condenser, or that of saturated steam corresponding to the pressure indicated by the vacuum gauge, in degrees F.; t , the mean temperature of the circulating water; and L , the latent heat of saturated steam at the temperature T . This formula applies to an engine having an independent circulating pump. When the pump is worked by the main engine, the value of S should be increased about 10 per cent.

The value of W , the pounds of steam sent to the condenser per hour, will vary with the type of engine used, initial pressure of steam, ratio of expansion, and whether the cylinders are steam-jacketed or not. No more reliable data are accessible on this point than the results of Messrs. Loring and Emery, and here summarized, viz. :

Type of condensing engine.	With or without a steam-jacket.	Absolute steam-pressure in boilers. Pounds per sq. inch.	Pounds of steam used per I. H. P. per hour.	Condensing surface. I. H. P.
Two cyl. compound, 90°.....	With.	55	22	2.08
Two cyl. compound, 90°.....	With.	85	18.4	1.74
Non-compound.....	With.	27.5	33 to 37	3.12 to 3.5
Non-compound.....	With.	55	22 to 26.5	2.08 to 2.53
Non-compound.....	With.	85	20.5 to 25	1.94 to 2.36
Non-compound.....	Without.	27.5	40 to 44	3.78 to 4.15
Non-compound.....	Without.	50	26.7 to 31	2.54 to 2.93
Non-compound.....	Without.	85	21.7 to 25	2.05 to 2.36

In designing, Professor Whitham points out, it is never well to anticipate a vacuum exceeding 25 inches of mercury when the engines are developing full power. This corresponds to about 2.5 pounds pressure. So that $T = 135$ and $L = 1020$, and may be reduced to

$$S = \frac{1020 W}{180(135 - t)} = \frac{17 W}{3(135 - t)}$$

The value of t will vary with the quantity of circulating water used and the season of the year. It being the arithmetical mean of the initial and final temperatures of the circulating water, is about 60 in the winter and 75 in summer. Since the larger value of t gives the greater value of S , we will substitute $t = 75$, and becomes

$$S = \frac{17 W}{3(135 - 75)} = \frac{17 W}{180}$$

The pounds of circulating water required per hour is as

$$\frac{W(L + T - T)}{R}$$

T being the temperature of the condensed steam as it leaves the condenser—i. e., the temperature of the hot well and R the rise in temperature of the circulating water.

A Texas Iron Enterprise.

Texas is to become more notable than it has been in iron manufacturing, a new company, the Cherokee Land and Iron Company having been formed to work the brown hematite of Cherokee County. The State has for years manufactured iron at Rusk, Texas, and the new company, which control about 20,000 acres of iron and timber lands, is to build a 50-ton furnace at New Birmingham, a projected town. The enterprise is being conducted by H. H. Wibirt, of New York; R. L. Coleman, of St. Louis, and A. B. Blevins. Mr. John Birkinbine, of Philadelphia, has made a report on the property from which the following extracts are taken: "The ore deposit is remarkable for its apparent uniformity, and exhibits greater regularity as to stratification than any brown hematite ore field of which I have cognizance. When the hills are of sufficient elevation, the ore appears with remarkable persistency as a nearly horizontal bed, which crops out along the sides and near the crests of the hills forming the rolling country of the neighborhood. The entire formation is of a late geological age, probably tertiary. A section would represent a soft sandstone, remarkably free from grit in many places, resembling in color and the ease with which it can be cut or turned when freshly quarried, the caenstone of France. On this the ore lies with a seam of clay, generally between the ore and the stone. The ore is capped by a thin layer of feruginous sandstone, while on top of this is the sand. The ore is brown hematite, varying in physical structure from compact masses to laminated and in some cases coarsely granular ore, and in color from light brown to nearly black; occasionally a glossy surface and incipient pots and botryoidal forms are found in the tules resulting from ledges breaking away, bowlders and fine ore abound, the latter forming a decided "blossom." The

thickness of ore and 3 feet average thickness of sand stripping, taking out the ore by benching:

The cost of winning 1 ton of raw ore is estimated at.....\$0.65
Allow for loss 20 per cent. in roasting.....0.13
Cost of roasting.....0.17
Hauling or tramping to the blast furnace. 0.18

Cost of 1 ton of roasted ore.....1.13

These figures will probably be reduced in the earlier history of a new enterprise, as the initial stripping will be light, but it should safely represent the cost of ore for a series of years and permit the assembling ores from various points which may vary somewhat in physical character or chemical constituents. Using the data as given, the following estimate of the cost of producing 1 ton of charcoal pig iron from local ores is presented:

Cost of Making 1 Gross Ton of Charcoal Pig Iron.

2 tons of roasted ore at \$1.13.....\$2.26
4-10 ton of limestone at \$2.50.....1.00
110 bushels of charcoal at 6 cents.....6.60
Labor at furnace.....1.45
Office and superintendence.....0.35
Incidentals and supplies.....0.30
Interest depreciation and repairs.....1.00

Total.....\$12.96

Or, say, \$13 for a gross ton of iron ready for shipment.

The results obtained at the Rusk penitentiary demonstrate that the ores obtained from the district under consideration produce an iron eminently adapted for foundry purposes, having tenacity, fluidity and chilling properties. Immediately joining the State furnace is a pipe foundry, where cast-iron water pipe are made from iron run direct from the blast furnace into a large receiving ladle. As these pipes, to meet the requirements of engineers' specifications, must be cast thin, and subjected to a hydrostatic test, under a pressure of 300 pounds per square inch, some of the qualities of the iron are exhibited in their manufacture. An examination of broken pieces of pipe or casting showed a very satisfactory fracture.

The foundry inside of the penitentiary walls produced most of the castings, amounting in value to about \$100,000, for the new State Capitol building at Austin, Tex., some of which were long fluted columns, others ornamental orioles, &c., and in addition made stove and other castings. Upon the output of the foundry considerable machine work was necessary, and an investigation of the work in progress in the machine shop demonstrated that the iron was well adapted to treatment by the various tools.

The Marshall Car and Foundry Company, at Marshall, Tex., use the pig iron produced at the State blast furnace alone in the manufacture of car wheels regularly, and during my late visit a contract was made to supply a new car-wheel foundry at Houston, Tex.

Pig iron which so well answers the requirements of foundry practice should find a good market in a State of such vast dimensions, and which is making so many rapid strides in internal development as Texas, and the demand for foundry irons is now, or very soon will be, more than equal to the capacity of an iron furnace of moderate size. The only information concerning the use of the pig iron made from the Cherokee County ores in rolling mills show that it could be puddled and made into bar iron or other shapes. The Helmbacher Forge and Rolling Mill Company, of St. Louis, made the following test: A bar $\frac{1}{4}$ inch square, separated under a tensile strain of 54,200 pounds, equal to 60,000 pounds to the square inch. The elongation in a 6-inch bar $\frac{1}{4}$ inch square was $\frac{1}{4}$ inch in 6 inches. The result of the examinations made lead to the following conclusions:

1. That the ore deposits of Cherokee County, Texas, are of such extent as to

encourage their utilization by the erection of blast furnaces to smelt their ores.

2. That the pig iron produced will be of a character for which there will be a ready demand in the district most conveniently reached.

3. That there is an abundance of wood of good quality for producing charcoal at very satisfactory rates.

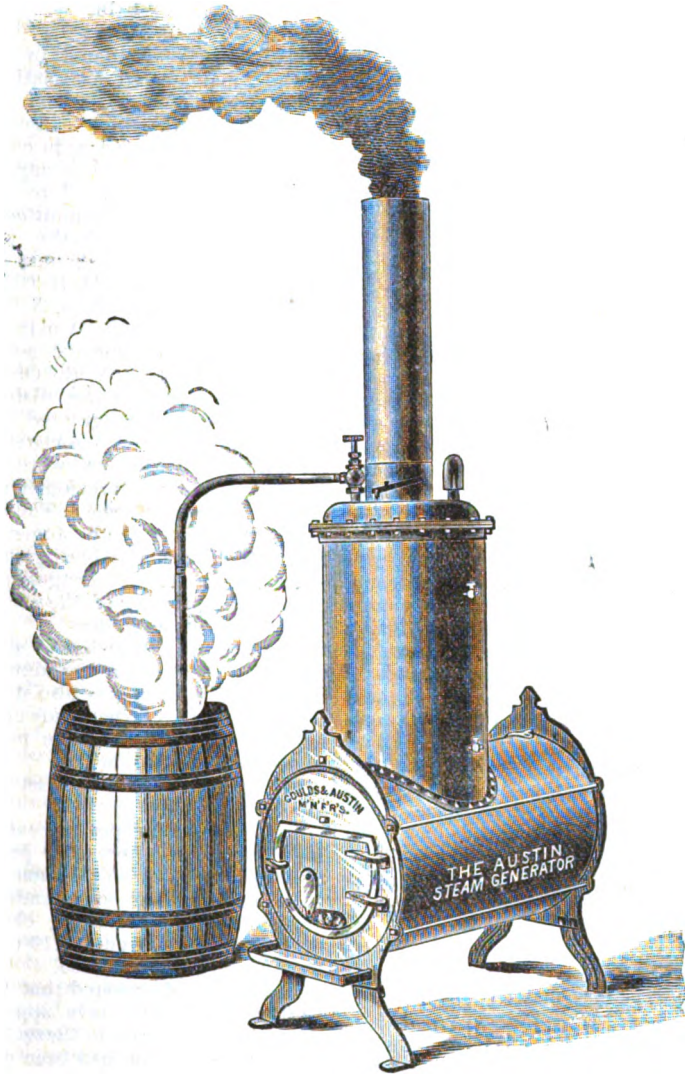
4. That the flux, while now costing too much per ton of iron, can be reduced to a cost which will not interfere with the financial success of a blast furnace enterprise.

5. That labor is abundant and the character of the adjacent country is well adapted for its sustenance.

over from the previous year. The foreign indebtedness incurred in various loans somewhat exceeds \$34,000,000, but is nearly all funded through the Rothschilds at 4½ per cent. interest. The Chilians are importing relatively increasing quantities from the United States of our staple manufactures.

Steam Generator for Stock Raisers.

It has been demonstrated to the satisfaction of intelligent stock raisers that food, when cooked, is more economical and will give much better results than an even greater amount of uncooked food.



STEAM GENERATOR FOR STOCK RAISERS, MADE BY MESSRS. GOULDS & AUSTIN, CHICAGO, ILL.

6. That a blast furnace well located could command a trade which would allow of a very satisfactory profit on its output, with no immediate fear of damaging competition from other sources.

7. That supplies of mineral fuel suitable for iron manufacturing can be brought to the district so as to encourage other industries.

The enterprising little republic of Chili, with its population of only about 3,000,000, is making astonishing progress. The last report of the Chilean Secretary of the Treasury shows that during the last ten years the revenues and foreign trade of the country have more than doubled. The Government, which in 1866 could count upon little more than \$9,000,000, and in 1877 upon an income of a little under \$17,000,000, now estimates an income for 1888 amounting to \$36,000,000, to which is added a surplus of \$8,000,000 carried

When cooked, the food is more easily assimilated, but when fed raw a large proportion is not acted upon by the gastric juice of the stomach. The accompanying illustration, showing what is known as the Austin Steam Generator, will therefore prove of interest. It is primarily intended for cooking feed and heating water for stock, but it can be used also for boiling water for slaughtering, heating water for the bathroom, boiling water for the laundry, for canning and drying fruit, renovating feathers, and many other purposes of a similar character. The fire is completely surrounded by water, the water spaces on the sides and end of the steamer measuring 2½ inches. The boiler is provided with test cocks, a safety valve and a blow-off cock. The latter is placed at the lowest water point, permitting the blowing off of all sediment. The boiler will burn wood, coal or cobs. The fur-

nace door is large, and the fire easily started and maintained. A return flue is provided.

The capacity of the generator is ten pails of water, and it is claimed that steam can be raised in 15 minutes. It is made by Messrs. Goulds & Austin, 167 and 169 Lake street, Chicago, Ill., heavy material being used, and all seams being securely riveted with as much care as is used in the manufacture of regular type of steam boiler.

Trade and Presidential Elections.

Many people, says the New York *Journal of Commerce*, are puzzled to understand why the year of the presidential election should be a dull year for general trade. They argue that it takes as much food to support life one year as another; they insist that clothes wear out as fast during these 12 months as in any other; that houses built in the quadrennial year last as long as if erected at any other period—in short, that the prevalent indisposition to engage as actively in buying and selling and building during the progress of this political canvass is totally unreasonable. They hold that if people only thought so, the trade might be as active at the height of the campaign as if no such contest was taking place.

They hit it exactly in saying that trade might now be as active as at this date last year "if people only thought so," but it is the thought that makes all the difference. There is no more potent factor in the business world than the prevalent impression concerning the prospects of trade. If the retailer thinks there will be a large demand for goods he will order a larger stock, and the jobber will contract for more liberal supplies with the manufacturer and the importer, and this creates an active season, but it sometimes happens that the retailer is mistaken, and his increased purchases remain on his hands. He thought there would be a large demand for distribution, and he finds himself mistaken, and his groaning shelves and well-packed storehouses testify against him. To make it certain the movement must originate further back than the dealer. The moment that the mass of the people think that the time has come to buy the activity begins in good earnest. The duller intellect will agree that if there is to be a rush of business those who buy earliest will buy cheapest and have the best selections. This sets the wheels in motion and as far onward as the connection is maintained the activity is sure to be felt.

It is difficult, perhaps, to say exactly how the idea that the year of the election is not a good year for business gained ascendancy at the first, although we may without any great stretch of imagination trace it to purely natural causes. During a very exciting political contest those most deeply interested would, by force of circumstances, do less buying in the market. The busy politician would have less time to give to repairing his house, or replenishing his wardrobe, or restocking his stable, or attending to the score of other things calling for the expenditure of money. Then, not a few are hopeful that in some way their fortunes will be bettered by the result of the election, and they postpone their outlay for this reason. But the fact that so many people have something else to think about, and that, too, upon a topic quite absorbing in its character, will naturally divert their minds from projects little or great which involve the opening of the purse.

Dealers are very quick to observe such change, and they have come to see that when the public mind is thus occupied the stock of goods does not go off as freely, and by a wise forethought they give smaller orders in anticipation of such

a result. Let there be a common apprehension of some impending calamity, as of a coming pestilence, or a drouth, or an army of caterpillars, and the volume of trade, however active it has been up to that time, shrivels in amount. It is only a thought; no one has the cholera or the scarlet fever; no fields have been dried up or scorched, or devastated, but the dread of it paralyzes the movements of trade.

Midsummer Iron and Steel Statistics.

DECREASED PRODUCTION OF PIG IRON, BESSEMER STEEL, AND STEEL RAILS IN THE FIRST HALF OF 1888.

The American Iron and Steel Association have received from the manufacturers complete statistics of the production of pig iron, Bessemer steel ingots and Bessemer steel rails in the United States in the first six months of the present year; also complete statistics of the stocks of unsold pig iron in the hands of manufacturers or their agents on the 30th day of June last.

PIG IRON.

The total production of pig iron in the United States in the first six months of 1888 amounted to 3,382,503 net tons of 2000 pounds, or 3,020,092 gross tons of 2240 pounds. Our production in the last six months of 1887 was 3,771,996 net tons, or 3,367,853 gross tons. The production in the first half of 1888 was 347,761 gross tons less than in the second half of 1887, but it was only 29,203 gross tons less than in the first half of 1887. The production in the last five half years has been as follows, in both net and gross tons.

Production.	Net tons.	Gross tons.
First half of 1886.....	2,954,209	2,637,687
Last half of 1886.....	3,411,119	3,045,642
First half of 1887.....	3,415,210	3,049,235
Last half of 1887.....	3,771,996	3,367,853
First half of 1888.....	3,382,503	3,020,092

Our decreased production in the first half of 1888 was wholly in Bessemer pig iron, as the following figures will show.

	Last half 1887.	First half 1888.
Gross tons.....	3,367,853	3,020,092
Total production.....	1,561,061	1,178,508
Foundry & mill pig iron.....	1,906,792	1,841,584

These figures show that the production of foundry and mill pig iron in the first half of this year was slightly in excess of the last half of 1887. But the decrease in Bessemer pig iron was very great.

All the important Northern and Western pig iron producing States show a decreased production of pig iron in the first half of this year as compared with the last half of last year, except Ohio, whose production in the last six months was the highest attained in the history of the State in a similar period of time. The production of pig iron by the nine Southern States of Alabama, Tennessee, Virginia, West Virginia, Kentucky, Georgia, Maryland, Texas and North Carolina in the first half of 1888 was 433,796 gross tons, against 432,330 gross tons in the last half of 1887.

Our production of pig iron in the first half of 1888 was divided among the fuels used as follows, in comparison with similar details for the last half of 1887;

	Last half of 1887.	First half of 1888.
Fuel used—gross tons.....	2,071,693	1,885,539
Bituminous.....	868,929	789,874
Mixed anthracite and coke.....	146,201	96,252
Anthracite alone.....	281,030	248,427
Charcoal.....		

Total..... 3,367,853 3,020,092

The very small quantity of pig iron which is now made in this country with anthracite coal unmixed with any other fuel is a remarkable fact. As late as 1871 we made more pig iron with anthracite coal than with all other fuels combined.

The stocks of pig iron which were unsold in the hands of manufacturers or their agents on the 30th of June last, and which were not intended for the consumption of the manufacturers, amounted to 358,273 gross tons, against 301,913 gross tons on the 31st of December last, an increase of 56,360 gross tons in six months.

BESSEMER STEEL INGOTS AND RAILS.

The production of Bessemer steel ingots in the United States in the first half of 1888, including 36,070 net tons of Clapp-Griffiths ingots, was 1,384,288 net tons, or 1,235,971 gross tons, against 1,650,785 net tons, or 1,473,915 gross tons, in the last half of 1887, a decrease of 237,944 gross tons.

The production of Bessemer steel rails in the first half of 1888 was 775,261 net tons, or 692,197 gross tons, against 1,146,117 net tons, or 1,023,320 gross tons in the last half of 1887, showing a decrease of 331,123 gross tons. These figures do not include a few thousand tons of Bessemer steel rails rolled in each period in iron rolling mills from purchased blooms. The production of Bessemer steel rails in the first half of 1888 was reduced much more than that of ingots, indicating an increased use of Bessemer steel thus far this year for miscellaneous purposes of nearly 100,000 gross tons over the last half of 1887.

The Cost of Rolling Wire Rods.

In response to a number of inquiries we present below the figures given in an affidavit made by William M. Douglass, who was for four and a half years superintendent of the steel mill of the Gautier Steel Company, Limited, and the Gautier steel department of the Cambria Iron Company, at Johnstown, and for two years superintendent of the Hartman Steel Company, Limited, at Beaver Falls, having charge of wire-rod mills of various kinds during that time. The statement of the cost of manufacture of 1 ton of 2240 pounds of No. 6 wire rods attached to this affidavit is based on actual wage rates and costs two years ago, except the price of billets, which is the present rate. The number of hands named is that of one turn and covers all labor required to place billets aboard the car and deliver rods on the car and to handle all scrap and other waste:

Cost No. 6 Wire Rods (Per Ton 2240 Pounds).	
Labor (other sheet).....	\$3.109
Fuel (gas).....	.550
Repairs.....	.800
Rolls, turning, &c.....	.350
Oil, waste and supplies.....	.400
Stock, 2540 pounds, at \$28.50.....	\$30.28
Scale, 100 pounds, at —.....	.00
Scrap, 40 pounds, at \$17.....	.30
	29.980

General expenses.....	\$0.250
Superintendent.....	.120
Royalty.....	.100
Interest.....	.250
Other expenses.....	.100

36.009

Wages Rod Mill.

Mills per gross tons.	Mills per gross ton.
1 roller.....	.330
1 assistant roller.....	.162
1 rougher.....	.088
1 rougher.....	.104
1 catcher.....	.077
1 hook.....	.060
1 bender.....	.102
1 bender.....	.106
1 bender.....	.110
1 finisher.....	.112
1 hook.....	.066
1 hook.....	.060
1 hook.....	.042
1 lead out.....	.044
1 pick up.....	.166
1 hook.....	.044
1 reel.....	.062
1 take off reel.....	.060
1 heater.....	.175
1 helper.....	.175
1 heater.....	.075
1 helper.....	.075
1 telegraph.....	.070
1 telegraph.....	.070
1 engineer.....	.065
1 engineer.....	.060
1 oiler.....	.040
1 stocker.....	.053
1 stocker helper.....	.043
1 bundler.....	.045
1 bundler.....	.045
1 bundler.....	.045
1 pull back.....	.050
1 fireman.....	.062
1 weighmaster.....	.045
1 Shearsman.....	.045
3 laborers, at .032.....	.096
each.....	.096
3 laborers, at .0266.....	.080
each.....	.080

It is fair to state, however, in connection with these figures, that Mr. George

T. Oliver, during the hearing, announced that the chairman of the Hartman Steel Company, then present, authorized him to say that the figures given are not correct, and that he would furnish the committee with the actual figures of cost of manufacturing by that company. Mr. William R. Stirling, treasurer of the Joliet Steel Company, made the point that the relation of duty to the cost of labor in finishing is deceptive. We not only require protection to cover the increased cost of labor in this country, as compared with the cost of labor abroad, but we also desire protection to cover the increased cost of supplies, coal and a good many other items entering into it.

The Modifications in the Wages Scale.

In the scales formulated in convention by the Amalgamated Association were a number of conditions and extras not contained in the scales that expired on June 30 last. Failing to agree in conference—in fact, failing to consider any portion of the proposition submitted to the manufacturers' Conference Committee—the first actual consideration of the proposition submitted by the Amalgamated Association was had with Mr. D. B. Oliver, of and for the firm of Oliver Bros. & Phillips, in the general office of the Amalgamated Association, after failing to agree in the general conference. At the Oliver conference, after nearly 12 hours' discussion, certain concessions were granted on the part of the Amalgamated Association committee. These concessions were of course granted to all who previously and subsequently signed the scale. The next modification obtained was by Jones & Laughlins, which has also been granted to all other firms. These changes were made prior to the printing of the scales in book form, and were as follows:

The roll turners' scale was stricken out entirely. In the memorandum of agreement the following was also stricken out:

"4. That for all crop ends on finishing mills used for merchantable purposes the same shall be paid for."

In the boilers' scale the last clause was eliminated—namely:

"10. One dollar per ton extra for boiling in furnaces where four puddlers and their helpers work on the same standing."

In the guide mill scale, under the head of "angles," the following changes were made: $1\frac{1}{4}$ by $\frac{3}{4}$, from \$4.10 to \$3.20; $1\frac{1}{2}$ by $\frac{3}{4}$, from \$4.10 to \$3.65.

It was also discovered that the figures \$2.03, that should have appeared opposite the $2\frac{1}{2}$ card rate in the scale for scrap-ping and busheling, had been omitted.

As above intimated, these concessions, changes and errors were allowed, made and corrected prior to the printing of the scales in book form. The scales were then gotten out and distributed to sub-lodges.

Since then (last Monday) the following has been granted on the hoop mill scale—note No. 9 on page 14:

"9. All hoops $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, $1\frac{1}{4}$, $1\frac{1}{2}$ and $1\frac{3}{4}$ inch lighter than No. 22, 10 per cent. extra on above prices."

This last concession (an addition to last year's scale) will also apply to all mills making such product.

The citizens of Dunbar, Fayette County, Pa., have formed an association, entitled the Dunbar Improvement Association, and have issued a small pamphlet reviewing the history of that well-known iron manufacturing town, and calling attention to its special advantages, among which are proximity to the famous Connellsville coke district and the local iron ore deposits, the supply of natural gas, glass sand, fire-clay and other raw materials.

A Farewell to Midvale.

During the past month Mr. R. W. Davenport, who has been connected with the Midvale Steel Company for 14 years, resigned his position as manager to accept the charge of the Bethlehem gun foundry, now building. The occasion was seized by the employees of the Midvale Steel Company to express to their chief their appreciation of his work and their kindly feelings by presenting him with a gold watch and a gold chain, a miniature of the first all-steel gun made in the United States. The presentation speech was appropriately made by J. K. Griffith, superintendent of the melting department.

Mr. Davenport in his reply reviewed the history of the struggles of the Midvale Company to attain the recognized position it now occupies. He said:

It was 14 years ago last May, in 1874, that I came into the laboratory at Midvale, a rather fresh and green looking young man, I fancy, as some of you may remember. The works had just then passed through a crisis which had come near being fatal, and life was being brought back under the direction of Mr. Middleton, as superintendent, and Mr. Brinley, as his assistant in charge of the laboratory and the steel making. The works had been brought into this low condition by the grossest carelessness, if not ignorance, in the direction of the details of manufacture. Good and willing men were not lacking, the bone and sinew had been there, practical skill in melting, heating and working steel had been there, and there had only been needed, to make the enterprise a success, a more accurate chemical knowledge of the difference between good and bad steel and a common sense and conscientious application of it in the direction of the work. These requirements were well filled by Mr. Middleton and Mr. Brinley, and they took hold of the work in such a way as to make every true man trust and respect them. It was no easy task; the reputation of the works for producing good material was absolutely gone. Something like 3000 tons of steel of various kinds and in various conditions of manufacture were piled about the yard regarding which little or nothing was known. The only stock record book in existence was in the brain of old Miky Kelley, and to him Mr. Brinley would go for information, such as it was. The question of assorting this mass of material and determining its usefulness had to be solved by the laboratory, and it was to help in this work that I came to the works. By careful selection and mixing with high grade pig irons, purchased for the purpose, all this old stuff was successfully worked into rail blooms for which we got over \$100 per ton (the present selling price of rails is below \$30). This contract for rail blooms was with the Reading Road, and had been nearly cancelled on account of the former management of the works trying to use old ingot molds in making the steel, and thereby putting in so much phosphorus as to cause the rails to break in unloading. In the autumn of 1874 a very sad thing happened Mr. Middleton. Run down by overwork and anxiety, he was taken with typhoid fever, and after a most painful illness died in November. Mr. Brinley was now made superintendent, and I came from the laboratory to be his assistant. At this time there were less than 75 men employed at the works. One small open-hearth furnace was in operation; No. 1 hammer ran a few days a week; some tool steel was melted in the crucibles and hammered at old No. 3 hammer. Something had to be done to increase the product of the works. The Pennsylvania Railroad was then purchasing axles, rough turned all over, for its passenger service from England, and paying 13½ cents per pound for them. They were guaranteed to stand a very severe

test, and no one had made them in this country. The officials of the road scarcely cared to give us an order, but we finally took an order for 100 axles and went to work. Pete McAnally will remember how carefully we considered the subject and analyzed a piece of an English axle; how many trial heats we melted, and how anxiously we watched the result of the drop test, shivering in the cold those winter days. Finally we succeeded, and have since made many thousand of these axles for the Pennsylvania Road, and have been selling them for several years past for about 4½ cents per pound, which speaks well, I think, for the ability of our English cousins to charge a big price when they think they can get it, and for the effect of home competition in reducing price notwithstanding a protective tariff.

We next turned our attention to tires. As already said, the tin mill had been shut down; the tires had become so bad that they could not be sold. We believed that a first-rate tire could be made in the open-hearth furnace and went to work to do it. P. Conner will remember the first open-hearth tire ingot made in this country and sent to the forge to be punched and beaked. He looked at it very suspiciously, but it did not bite him and it did hammer very well. The manufacture of open-hearth tires soon ceased to be an experiment, and the works have since sold over 125,000 of them. In the meanwhile additional hammers and rolls were put in and the production of miscellaneous forgings, tool and spring steel, &c., constantly increased. Then came the first call from the Navy and Army for steel for built-up guns. We grappled with the subject with great doubts of our success; the tests demanded were very severe and our facilities very limited, but Mr. Brinley's careful, scientific mind directed our first efforts and we obtained promising results from the start. The development of this work has, I think, been a great advantage to the works and most instructive to all concerned. Up to the present date no other works in the country has supplied the Government with any large amounts of ordnance material. And now I have referred to a few things which we have accomplished at Midvale during all these pleasant years of work. We might have done more, but I don't think that we need be ashamed of our record; but, my friends, the fact that gives me more pleasure and satisfaction than any I have mentioned to you is that during all these 14 years, first under the direction of Mr. Brinley and then, since 1882, under my direction, we have never had a serious disagreement and work has never been stopped by a strike. And what has been the cause of this most desirable condition of affairs? It is, I think, chiefly because we have been able to trust one another. You have been led by comparatively young men, who have brought from the schools knowledge learned from books and the laboratory. They have come among you (and I do not speak now of myself alone, but also of the corps of able assistants with whom I have had the pleasure of working), not with an overbearing importance of the theoretical knowledge they had acquired, but with a high appreciation of the practical knowledge and skill acquired by you in years of hard work and with a desire to learn from you and give what they could in exchange. They have tried, I think, not to take undue advantage of the power accompanying their position, and not to make promises that they could not carry out. They have endeavored to know you personally; to meet you as man to man; to make you trust them, and their efforts have not failed.

The Director of Public Works, in Philadelphia, has awarded contracts for a gas-holder tank to Erskine D. Smith for

\$59,420.70; gas-holder to Morris, Tasker & Co. for \$46,820, and a 14-foot station meter to Helme & McIlhenny for \$4500. Contracts for iron pipe were awarded to the Donaldson Iron Company at the Gloucester and Camden Iron Works, and for pig lead to James C. Burton.

Test of Fireproof Wire Lathing.

A special train from Broad street station, last Wednesday, took out to Germantown Junction a large number of architects, builders, insurance men, and parties connected with the iron and steel trade, to witness a comparative test of the durability under fire of the ordinary wooden lathing, now generally used, and the fireproof patent stiffened wire lathing of the New Jersey Wire Cloth Company. A substantial two-story brick structure, about 8 by 12 feet in size, had been erected, with a stout dividing wall in the center, making two compartments. One apartment had its ceiling of wooden laths, nailed to joists and plastered over, and the other of wire cloth, upon which the plaster had been spread. A hot fire was built in each compartment after everybody interested had an opportunity to inspect the preparations by going up a ladder to the top of the structure, upon which no roof had been placed, the better to subsequently compare results. At the end of ten minutes, when the fire was extinguished, the wooden lathing had burned away, the plaster had fallen into the ashes beneath, and the joists became charred from the flames. In the other compartment, where the wire cloth was used, it and the plaster remained intact at the end of that time, as it did over an hour afterward, when the fire there had been allowed to burn out. The test seemed to meet the general approval of the spectators, who commended the use of the wire lathing in buildings intended to be fireproof, or, at least, slow burning.

Pittsburgh Pig Lead Freight.—The Pittsburgh and Lake Erie Railroad and its connections have made the following rates on pig lead in carloads, 24,000 pounds and over from Pittsburgh to the following named points: Rochester, 10½; Syracuse, 11½; Utica, 11½; Albany, 13½; New York, 13½; Boston, 18; Portland, 22½. The new rates went into effect on Wednesday the 25th ult.

The Detroit Dry Dock Company, of Detroit, Mich., have just commenced the construction of four large steamships, to be completed for next season's business. Two will be duplicates of the J. Emory Owen, and will be built of wood. The others will be composite, having iron frames and plating above water and plank below, similar to the Fayette Brown, but larger. The composite part will be 296 feet long, and will be built at the Wyandotte yard.

The Southern Railway and Steamship Association have issued a rate-sheet on pig iron, which went into effect on the 1st ult., making the rate to Cincinnati \$2.75 from Birmingham, \$2.25 from Chattanooga and \$2.50 from Sheffield and Florence, Ala., while the rates to Louisville are \$2.50 from Birmingham and \$2.25 from Chattanooga, Florence and Sheffield.

Contracts for furnishing steel for the armored battle ship Texas, to be built at Norfolk, Va., have been awarded as follows: Park Brothers & Co., of Pittsburgh, 920 tons of steel plates, \$66,770; Carnegie, Phipps & Co., of Pittsburgh, 503 tons of steel shapes, \$43,266, and 100 tons of rivets, \$8601; and the Standard Steel Casting Company, of Thurlow, Pa., 120 tons of steel castings, \$41,664.

THE WEEK.

The immense docks of Montgomery, Champaign & Co., at Lakeside, Mich., were destroyed by fire, together with 1,500,000 feet of lumber; loss, \$175,000.

During the month of June there were exported from the port of New York 21,831 packages of American agricultural implements, the total value of which was \$398,188; 245 cases of firearms, valued at \$36,660; 492 cases of tacks, valued at \$3887; 4498 kegs, 1216 cases, 28 boxes and 70 packages of nails, valued in all at \$20,826; and 1508 cases of American made cutlery, worth \$30,386.

The aggregate of Government receipts from the sale of public lands was greater last year than ever before. The sales amounted to about \$11,000,000, compared to \$9,000,000 for the previous year and \$5,000,000 for each of two years preceding.

The improvement of New York harbor is spoken of in detail by Engineer McFarland, U. S. A., in his annual report. The project for the improvement of Gedney's Channel, he says, provides for dredging a channel 1000 feet wide and 30 feet deep at mean low water, from deep water below the Narrows, through the main ship channel and Gedney's Channel to deep water outside the bar. To maintain this channel will require either periodical dredging or a contraction of the entrance by the construction of a dike running across the shoals from the Coney Island side, with suitable protection for the head of Sandy Hook to prevent its being scoured away by the increased current. The estimated cost of obtaining the dredged channel is \$1,490,000, and the entire cost of the improvement, should the contraction work prove to be necessary, is estimated at between \$5,000,000 and \$6,000,000. The dredging done during the last fiscal year, Colonel McFarland says, has resulted in producing a channel of good navigable width across the bar 25 feet deep at mean low water, but, he adds, it resulted in no practical benefit to navigation, since no increase of depth was obtained on the shoals inside the bar. The work on the Gedney's Channel division will be completed within the contract time, but the main ship channel cannot possibly be cleared by December 1, 1888, at which date the contract expires. The amount needed outside of the present appropriation to widen these channels to 1000 feet and to deepen them to 30 feet is \$540,000. The speedy removal of Flood Rock is a necessity, and \$500,000 could be expended advantageously during the next fiscal year.

A correspondent at Pittsburgh refers to reports gathered from Knights of Labor prominent in the order, that the membership in that organization to-day does not exceed 150,000. In the Pittsburgh district, for example, the members have declined within the year from 11,500 to a trifle over 4000, and the famous district No. 49 of New York, has decreased from 81,000 to 10,000. Apathy, according to this authority, has caused the difference.

Three members of the firm of W. G. Price & Co., manufacturers of iron, lead and shot, of Pittsburgh, are seeking a new site somewhere near McKeesport. The firm desires to rebuild its works and the shot tower so as to double the capacity and employ not less than 100 men at the start, but cannot do it on the old location, as it is hemmed in by other works.

The American Paper Makers' Convention at Saratoga last week elected E. C. Rogers, of Holyoke, Mass., president for the coming year. It was stated by the retiring president, Byron Weston, that profits during the past year were less than

ever before. Warner Miller opposed putting alum on the free list. One of the reports stated that 300 tons of manila paper are made daily. They had tried during the year to restrict the business, but failed. Over 12,000,000 pounds of wood board had been made last year.

The Suburban Elevated Railroad is advancing along the upper part of Third avenue at the rate of 200 feet a day.

In a recent speech Mr. Vest, of Missouri, said: "The railroads have abolished river navigation, just as much as civilization has abolished the Indians as an autonomy in this country. The poor, straggling steamboat men who I see around this capitol now remind me of the last remnants of an extinct race, the melancholy historical remains of a former era. It is inevitable, and you cannot help it. * * * The old-time glory of the steamboat has gone like that of Tecumseh and the great Indian chiefs, never more to be seen in this country."

Four anarchist dynamiters have been indicted by the grand jury in Chicago. Seric, the gunsmith, seems to have been an efficient co-worker in the manufacture of the deadly bomb.

The Guatemala Central Railroad, extending from San José, on the Pacific Coast, 71 miles in a northeasterly direction to the Capital, has become one of the most successful enterprises in which citizens of the United States have engaged in Central America. The total cost, including short branches, was \$2,500,000, and the net earnings in 1887 were \$211,606. The rolling stock comprises nine locomotives from the United States.

Jay O. Moss has been elected president of the Hocking Coal and Iron Board, Ohio.

The Senate passed the Army Appropriation bill, including the Hawley amendment appropriating \$750,000 for a gun factory at Watervliet, N. Y., \$5,000,000 for the purchase of steel for heavy ordnance guns, \$500,000 for the purchase of submarine mines and \$100,000 for submarine controllable torpedoes. The Fortifications bill, as completed by the House Committee, provides for an ultimate expenditure of \$15,000,000, of which \$6,200,000 is to be appropriated this year. A board of army officers and civilians is authorized to be appointed by the President to contract with gun-makers for the supply of 12, 14 and 16 inch steel rifles, not less than 50 in number, and at an expenditure not exceeding \$2,500,000 annually. The bill also provides for the purchase of 50 cast-iron mortars and 20 12-inch iron rifles.

Traffic arrangements for the use of the Poughkeepsie Bridge have been completed with nearly all the railroads, preparatory to the opening for business, a few days hence.

There are 51 cases for violation of the Contract Labor law in Massachusetts on file at the District Attorney's office, all of which will come up for trial at the October Term of the United States Circuit Court. Of these about 40 are against the owners of fishing schooners, who hired men in Nova Scotia and brought them to sail from Gloucester and other fishing ports. The others are all against farmers, who hired help in the provinces and brought them to Massachusetts to perform agricultural labor. There are no cases pending against the factories.

The spread of New York City in the direction of Westchester County, across the Harlem River, is uninterrupted. The Suburban Elevated Road will be in operation to Fordham next winter, a distance of nearly 5 miles from the Harlem at Second avenue. The New York and Northern Railroad runs through the west side of the district to Yonkers and will open

stations for way traffic as fast as needed. Perhaps the greatest improvement in the district is the sinking of the tracks of the Harlem Railroad, now nearly half done. The Manhattan Bridge, over the Harlem River, is now being finished. When the Harlem road has sunk its tracks a tunnel is to be built in place of the present railroad bridge. Another tunnel under the river at McComb's Dam Bridge for general traffic will be commenced soon. With the completion of the Harlem River Canal in the next two years most of these improvements will be finished.

A feature in the Congressional inquiry into the subject of immigration, now being prosecuted in this city, is the testimony of Alexander Monaco, the Italian Vice Consul. A large proportion of the Italian immigrants, he said, were farmers or farm laborers, but they were generally without the means to get further than New York. Contractors and others send to their friends in Italy and tell them to send over men and pay their passage, which was \$24 each. The immigrants are sent to certain people in this city, who place them at work, generally at from \$1 to \$1.25 a day. They are then required to pay back to their employers on this side the price of their passage and a liberal interest therefor. The amount the immigrants have to pay is sometimes as high as \$50, and the advance on the ticket is never less than \$5. Sometimes the bosses or contractors default after receiving the emigrants' wages, and leave them in the lurch. The contractors also act as ticket agents of the steamship companies.

Mayor Hewitt wants the Senate Aqueduct Committee to proceed with its investigation, as the new commission will be called upon to decide questions affecting not only the construction of the work but the compensation to be paid to the contractors.

Capt. John Ericsson entered upon his 86th year on Tuesday, July 31.

The contract for the great Soo water-power canal at Sault Ste. Marie, was awarded to MacArthur Bros., of Chicago, for about \$250,000. Work will commence August 1, when 1000 men will be put on the immense undertaking. The canal will be three miles long, with a capacity of 800,000 horse-power. This, it is believed by the promoters, will make the Soo the great milling center of the Northwest.

Bids for ironwork on the new public building in Brooklyn were opened in Washington on Monday. Among them were J. H. O'Rourke, \$230,000; E. F. Gable, \$149,388; K. A. Murphy, \$250,000; E. P. Wright & Co., \$229,662.

Lieut.-Col. W. E. Merrill, in charge of the Ohio River improvements, recommends that the plans in successful operation at the Doris Island dam, below Pittsburgh, be applied on a more extended scale, and he proposes two or more movable dams to cost \$1,000,000.

Consul-General Raine, at Berlin, says that in his opinion it would be highly advantageous for American manufacturers and exporters to combine and open a permanent exhibition of American specialties at Berlin. He believes that this would influence many important trade connections, for the reason that the influx of foreign visitors at Berlin is attracting thousands of people. Only the best of our industrial products should be exhibited. As a condition precedent the ground should be carefully gone over by persons having at least a fair degree of familiarity with foreign languages and knowledge of the wants and customs of prospective purchasers. As an example of what may be done by making foreigners acquainted with our goods, a case may be cited in which inquiries were received by cable

from Japan for the purchase of paper making machinery in England. Fortunately the dispatch fell into the hands of a gentleman who knew the superiority of the American plant, and the result was that the Japanese delegation came to the United States instead of going to England, and determined to purchase two complete plants for paper making, together with the necessary power, the order reaching in all the sum of \$250,000.

One of the works of greatest magnitude at present under way at the Brooklyn Navy Yard is the digging of the new dry-dock, contracted for by J. E. Simpson & Co., of New York. Some idea may be formed of the immense amount of timber required for its construction from the statement that it will take about 3,000,000 feet—or, in other words, equal to that contained in the wonderful timber raft coming here from Joggins, Nova Scotia, to complete the work.

In France, a new cruiser, known as the *Cecille*, has recently been launched, which is to be armed with six 5-ton and ten 3-ton guns, and is expected to make between 19 and 20 knots. This is one of 15 vessels of this class to be built there. Russia has planned three of a similar class, of which one will soon be afloat, and England recently launched one of five recently ordered. The five American cruisers now building will rank about the same as to size and speed.

There are invested in Michigan in saw mills and other machinery in the lumber business \$40,000,000, employing 28,000 men.

Fruit growers in California fear they will be unable to gather their crops this year, on account of the scarcity of labor since Chinese restriction has been enforced.

P. T. Barnum celebrated his 78th birthday by giving a building and lot to the Bridgeport Scientific Society at a cost of \$200,000.

Brazilian planters who lost their slaves through the emancipation bill are now clamorous for compensation. The Government idea had been to furnish money to the planters upon mortgage of the growing crops, and to supply this resource through a bank, but the Bank of Brazil demanded favors which the Government was unwilling to concede. The planters, however, are unanimous in the demand, not for temporary assistance, for which they would have to pay high interest, but for compensation for the property of which they were suddenly deprived.

With the lessened demand for iron, a possible shortage in the wheat crop and a largely increased tonnage seeking employment, the season of navigation on the lakes is not promising, and business at all the lake ports is much depressed.

There were five bidders for steel for use in construction of the United States armored battle ship *Texas*, to be built at Norfolk, the lowest being as follows: For 920 tons of steel plates, Park Brothers & Co., of Pittsburgh, \$73,983; for 503 tons steel shapes, Carnegie, Phipps & Co., of Pittsburgh, \$43,266; 100 tons of steel rivets, Carnegie, Phipps & Co., \$8602; 120 tons of steel castings, no bidders.

A new steam canal boat, the *World*, built by G. W. Hall, of Lockport, N. Y., is 96 feet in length, with a single-screw propeller and consumes $1\frac{1}{2}$ tons of coal per day. She easily made her first trip with a load from Buffalo to New York in six days. She cost \$7000.

The harbor of Yokohama is to be improved at a cost of \$1,700,000.

A contract for the building of the new paint shop of the Pennsylvania Railroad

Company, in Altoona, Pa., has been awarded to Hoover & Hughes, of Phillipsburg. The contract price is \$137,000.

Z. Taylor & Co.'s iron foundry, in Brooklyn, was damaged by fire to the extent of \$8000.

The best record yet made by first-class steamers, the *Umbria* and *Etruria*, stands at six days and two hours. It is expected that the City of New York and City of Paris, will outdistance her achievements. She was tested in many ways, but she was only tried for speed at short intervals, and each time she sped through the water at the rate of 23 miles an hour.

An examination of the official time tables for June, made by the *Railroad Engineering Journal*, shows that the fastest trains now scheduled are two on the Baltimore and Ohio, which are timed to run the 40 miles from Baltimore to Washington in 45 minutes without stops, making the rate of speed $53\frac{3}{5}$ miles an hour. No other train can be found which makes over 40 miles an hour.

The salmon pack of the Columbia River this season will be about 300,000 cases, and will net about \$1,950,000.

Findlay, Ohio, in utilizing its gas supply, made arrangements by which the town furnished fuel gas to factories without any charge whatever. The result is that it built 2700 new houses last year.

The report of the Commissioner of Labor, Carroll D. Wright, upon the strikes and lockouts of the past six years, which has just been issued, gives some interesting statistics concerning labor troubles in the State of New York. Since 1881 there have been 9247 strikes ordered in the State, 8716 of them by labor organizations. These strikes involved 9247 establishments, 4717 of which were closed for an average period of 15 days. Of the total number of strikes 4720 succeeded, 753 partly succeeded and 3759 failed. The total loss to employees aggregated \$8,581,784, and that of employers \$5,966,421. The sum of \$726,696 was raised by labor organizations to aid the strikers. In these strikes 376,584 employees were involved, and the places of 24,889 strikers were taken by new employees, of whom 4581 were brought from other places. One thousand five hundred and twenty-eight lockouts were ordered in the same period, closing an equal number of establishments an average period of 22 days. Of these 180 only succeeded, 137 were partly successful and 1090 failed entirely. The loss to employees was \$3,150,123; to employers, \$845,262, and \$392,316 was raised to support the locked-out employees. Of the total number of strikes occurring during this period 3416 were owing to demands for increased wages, while 2997 were for a reduction in the hours of labor. Of this latter number 1752 occurred in the tobacco trade alone.

A statement from the United States Consul at Hamburg shows that the exports from that district during the year ended June 30 amounted to \$5,936,535, which is a decrease of \$208,612 compared with the previous year. Metal, metal goods and hardware were included to the amount of \$61,545; zinc and spelter, \$13,610.

The Secretary of the Treasury recently submitted to the Attorney-General for an opinion the question whether the term "forgings of iron and steel," as used in the tariff act in the provision for "forgings of iron and steel for vessels, steam engines and locomotives, or parts thereof, weighing each 25 pounds or more," covers only forgings of the two metals combined, or both forgings of iron and forgings of steel. The Attorney-General gave it as his opinion that the term applied to both forgings of iron and forgings of steel, and

not alone to those forgings in which the two metals are combined. The Treasury Department has accepted this interpretation, and customs officers have been instructed accordingly.

The substitution of Belgian blocks for cobble stone in the streets of Philadelphia is the subject of a special message from the Mayor, who has come to an agreement with the street-car companies regarding co-operation in the work, the basis, it is said, being that the city shall pay \$1.50 per square yard of Belgian block and the companies about \$1. It is estimated that a mile of a Philadelphia street of ordinary width can be paved with granite blocks for \$40,000. On this estimate 17 miles of streets could be paved with the \$300,000.

Contractors in Ottawa, Ontario, say the Government will shortly call for tenders for the construction of the Sault Ste. Marie Canal, but they doubt whether the contract will ever be awarded, as they think the proposal is only a scheme to frighten the United States in the event of an unsatisfactory settlement of the fishery question.

An oil shipping firm at Pittsburgh have entered suit against the Pennsylvania Railroad Company to recover \$150,000 damages under the Interstate commerce law, on account of a rebate of 13 cents per barrel allowed a competitor, the firm referred to having been discriminated against to this extent on more than 260,000 barrels, besides suffering in other respects.

Four tea laden steamers running in connection with the Canadian Pacific Railway Line will deliver their cargoes at Vancouver this season. Of two cargoes that have already arrived the first consigned to New York, reached this city in 12 days from the Pacific Coast.

According to Congressman Dingley, of Maine, who has collected a vast amount of statistics relative to the paper interest of this country, especially his own State, wood, pulp and fiber is a product of no less than 21 States out of the 38. The capital employed in its manufacture amounts to \$25,000,000, the number of men employed in the mills being over 22,000.

Total immigration to the United States, save from Canada and Mexico, for the month of June was 68,475. For the same period in 1887 it was 65,884. Immigration for the year ended June 30, 1888, was 539,818, against 483,116 the previous year.

A new boycotting question has been decided by the Massachusetts Supreme Court. The *Lasters' Protective Union* caused several men carrying placards to walk up and down in front of a shop in which the employees were on a strike. The placards were intended to keep new men from taking the places of the strikers. The employers did not proceed against the offenders criminally or sue for damages, but appealed for an injunction to stop the placard business. The Supreme Court rules that it was a proper case for an injunction. It holds that the thing complained of was a nuisance detrimental to the interests of the employers, and, as such, one that ought to be abated by the court.

The Leary log raft, which is about to be towed from Nova Scotia to New York city, will cost, if successfully landed, as follows: The timbers cost, in Nova Scotia, \$13,000; the logs can be sold in New York for \$50,000. The timbers of the ship, if sawed on the Bay of Fundy, would require a fleet of 100 schooners to transport them to New York, or it would take 50 trains of 50 cars each to transport the lumber the same distance. There seems to be no doubt in the minds of tow-boat people in this city that the work of handling the raft will be successful.

MANUFACTURING.

Iron and Steel.

P. L. Kimberly & Co., Limited, proprietors of the Atlantic Iron Works, at Sharon, Pa., have signed the Amalgamated scale and operations were resumed in full on Wednesday, the 25th ult. On account of the retirement from the firm of Edward Roberts, William B. Roberts becomes general superintendent, L. A. Burrel assistant superintendent and R. D. Brown boss of the puddling department.

The Standard Iron Company, of Bridgeport, Ohio, have signed the scale and resumed operations. During the shut-down the firm made some very extensive improvements and additions to their plant, and in a few weeks the capacity for sheet iron will be almost doubled. They have built an addition 100 x 60 feet, in which are located two new sheet mills, built expressly for this company from plans furnished by Manager T. B. May. One is a specially heavy jobbing mill and the other is a mill built expressly to roll very thin sheets, to be used in the galvanizing mill. They have also built a galvanizing shop, with a capacity of 20 tons daily, and a plant in which coal gas can be made to supply the entire mill. This move is made necessary by the Wheeling Natural Gas Company refusing them gas at the old rate.

Cartwright, McCurdy & Co., operating the Enterprise Rolling Mill, at Youngstown, Ohio, and the Youngstown Rolling Mill Company, at the same place, have signed the Amalgamated scale and resumed work. The following note was eliminated from the agreement: "All hoops, $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, $1\frac{1}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$ and 2 inch lighter than No. 22, 10 per cent. extra on above prices." This refers to the lightning-rod scale, and especially to these two mills. The same rule will be stricken off when Lindsay & McCutcheon and J. Painter & Sons, both of Pittsburgh, sign the scale.

The night turn in the converting mill of the Edgar Thomson Steel Works, at Braddock, Pa., on the evening of the 23d ult. made the largest output ever made in the same time since the works were built. Sixty-three heats were made, producing over 600 tons of steel. The run is said to never have been excelled by any steel firm in the country under similar conditions.

The Columbia Iron and Steel Company, of Uniontown, Pa., have signed the scale, and their plant is now being operated to its utmost capacity. The firm are manufacturers of steel structural shapes exclusively, and have sufficient orders on hand to keep them busy for the balance of the year.

On Thursday, the 23d ult., the Warren Rolling Mill, at Warren, Ohio, signed the Amalgamated scale, and operations were resumed in all departments on Monday, the 30th ult. Except for a few weeks last year this mill has been idle since 1883. Last year Alderdice, Bishop & Co. expended more than \$100,000 in repairing the plant, and, after a short run, failed. The creditors then secured Henry Wick to operate the mill for them, and \$20,000 more has been put in, making what iron men claim to be the best mill in the Mahoning or Shenango valleys. A patent process of heating the iron that discounts natural gas for cheapness has been attached to the building furnaces, and it is expected that, for the first time in the history of the mill, iron will be made with profit to the owners.

James P. Witherow, engineer and contractor, of Pittsburgh, has just closed a contract with the Chester Rolling Mills, of Thurlow, Pa., for the erection of a new Bessemer steel plant, to be run in connection with their rolling mill. They will operate two 3-ton vessels with blooming mills complete. These will have an output of 350 tons per day and will give employment to 400 men.

A. M. Byers & Co., of Pittsburgh, signed the scale last week, and their plant is now in full operation.

The Hartman Steel Company, Limited, of Beaver Falls, Pa., are placing several sets of shears in their works and will soon commence to shear steel plow shapes. This is a new departure for this firm.

Norway Furnace, at Pottstown, Pa., operated under lease by Gabel, Jones & Gabel, was blown out last week. On Monday, the 23d ult., a portion of the tunnel head fell in, which could not be repaired without a stoppage. The Philadelphia Coal and Iron Company, who own this furnace, are repairing the old hot blast, and will put in an additional one. All the repairs and improvements can be made and the furnace be ready to resume operations in about two months.

The Buckeye charcoal furnace, at River-ton, Jackson County, Ohio, has been sold to F. E. Hinkley, of Chicago, Ill.

The bulk of the contracts for furnishing steel for the battleship Texas, to be built at Norfolk, Va., awarded at Washington, D. C., on Wednesday, the 25th ult., has been given to Pittsburgh concerns. The following awards have been made: Park, Bro. & Co., Limited, 920 tons of steel plates, \$66,700; Carnegie, Phipps & Co., Limited, 503 tons of steel shapes, \$43,226, and 100 tons of rivets, \$8601. The Standard Steel Casting Company, of Thurlow, Pa., were awarded the contract for 120 tons of steel castings, for \$41,664.

The Cambria Iron Company, of Johnstown, Pa., are rebuilding their Conemaugh Furnace.

No. 2 stack of the Appleton Furnace Company, at Appleton, Wis., has been taken down, and it will not be rebuilt.

The Moorhead-McCleane Company, proprietors of the Soho Iron and Steel Works, of Pittsburgh, signed the Amalgamated scale last week, and operations were resumed in full on Monday, the 30th ultimo. The demand for a 10 per cent. reduction, which affected the Knights of Labor in the employ of the company, has been withdrawn.

Lucy Furnace, No. 1, of Carnegie, Phipps & Co., Limited, at Pittsburgh, will be blown out some time during the present month, for the purpose of being repaired. This furnace has produced over 150,000 tons of iron on the present lining, which is certainly a remarkable record.

Carnegie, Phipps & Co., at their lower Union Mills, Twenty-Ninth street, Pittsburgh, have completed a large iron building over the department where much of their shape iron is shipped. It affords great protection to the workmen and also gives plenty of room for the handling of a traveling crane.

Ella Furnace, of the Wheeler Furnace Company, at West Middlesex, Pa., has been blown out for the purpose of being relined and repaired. An improved hot blast is being erected, and a new 87-inch cylinder upright blowing engine will be placed in position, and take the place of the present engines.

The Etna charcoal furnace, at Etna, Polk County, Ga., which has been idle for over two years, is now being repaired, and is expected to be put in blast in October.

A special dispatch from Lebanon, Pa., under date of the 26th ult., reads as follows: "An application is to be made for

a charter of an intended corporation to be called the Lebanon Rolling Mills, the character and object to be the manufacture of iron or steel. The new corporation will absorb Light's Rolling Mill, and erect additional mills with improved facilities for the production of iron and steel."

A recent issue of the Sharpville (Pa.) *Advertiser* says: "In 1870 Sharpville had three blast-furnace plants, producing 4500 tons of pig iron per month, or 54,000 tons per year. This represented approximately about 250,000 tons of freight per year. At the present time there are six plants, producing, say, 16,000 tons of pig iron per month, or nearly 200,000 tons per year, representing 1,000,000 or more tons in freight. The materials come principally from Michigan, Minnesota, Wisconsin, Ohio and Western Pennsylvania and other States. Sharpville has increased in population from 800 in 1870 to nearly 3000 at the present time."

The Bellaire Nail Works, of Bellaire, Ohio, signed the steel scale last week, and will resume operations in the Bessemer department in a few days, repairs having been about completed.

The Trumbull Iron Company, of Girard, Ohio, signed the Amalgamated scale on Tuesday, the 23d ult., and the works of the company are now in full operation.

The Mahoning Valley Iron Company, of Youngstown, Ohio, signed the scale on Wednesday, the 24th ult., and operation were resumed in all departments the next day. The firm employs about 1200 men.

The Hartman Steel Company, Limited, of Beaver Falls, Pa., are averaging a product of over 100 tons of wire rods a day.

On Saturday, the 28th ult., Andrews Brothers & Co., proprietors of the Haselton Iron Works, at Haselton, Ohio, signed the Amalgamated scale. The puddling department has already resumed operations and the finishing departments will be started up as soon as repairs are completed. This leaves but one firm in the Mahoning Valley that has not signed—the Hubbard Iron Company, of Hubbard—and it is understood it will sign as soon as the machinery is in shape.

At the works of the Cleveland Rolling Mill Company, of Cleveland, Ohio, the Bessemer steel works, new steel works, big and small hammer works, old and new blooming mills, the three rod mills, rail, puddle and bar mills, foundry, blast furnace and the model shop, are all working full handed.

On Saturday, the 28th ult., the Pittsburgh Forge and Iron Company, of Pittsburgh, whose plant is located in Mahony City, Pa., signed the Amalgamated scale. Operations were resumed in all departments on the 30th ult.

The Missouri Furnace Company, of St. Louis, are completing repairs to Furnace No. 1. The same has been relined from top to bottom and only the smaller repairs remain to be finished.

At the annual meeting of the North Chicago Rolling Mill Company, held on the 25th ult., at the company's office, in the Rookery Building, Chicago, there were 54,644 shares of the stock represented out of 60,000 shares. The report for the year's business of the company, ending June 30, 1888, shows

Gross earnings of.....	\$13,549,486.64
Gross tons.....	1,000,139
Volume of product.....	1,304,235
Raw material received.....	347,795
Pig metal made.....	313,016
Steel ingots.....	263,772
Steel rails.....	630
Steel beams.....	74,926
Bar iron, nails and muck bar.....	

The following Board of Directors was elected: Nathaniel Thayer, of Boston;

Orrin W. Potter, Edward C. Potter, of Chicago. The officers elected for the ensuing year are as follows: Orrin W. Potter, president and treasurer; Edward C. Potter, vice-president; Richard C. Hannah, secretary; William H. Hannah, assistant secretary; John C. Parkes, general manager; Francis Hinton, manager at Milwaukee. The manufacture of steel beams, tees, angles, channels and plates and the erection of works for this purpose will be fully considered at an early day.

Machinery.

The Providence Steam Engine Company, of Providence, R. I., who are the sole builders of the improved Greene engine, are now engaged in the construction of engines from 50 to 700 horse-power for the United States Electric Lighting Company, two orders, American Baptist Publication Society, George V. Cresson, C. S. Garrett & Son, Wm. Gray & Son, Croft & Allen, Philadelphia; Victory Mfg. Company, Saratoga, N. Y.; Ramsey & Gore, Ashley & Baily, John Dunlop, two orders, George Frost & Son, two orders, Paterson, N. J.; Peel Brothers, Staffordville, Conn.; Horace Remington & Son, J. P. Campbell & Co., Providence; Congree Mfg. Company, Columbus, S. C.; Hammond, Hull & Co., Savannah, Ga.; P. P. Kellogg, Springfield, Mass.; Jamestown Worsted Mill, Jamestown, N. Y.; Henry Woods, Son & Co., Boston, Mass.

The syndicate that recently purchased the Howe Scale Company's plant, at Rutland, Vt., is composed of Edward Chaffee, John W. Cramton, Dr. John A. Mead and E. D. Keyes.

The Westinghouse Air Brake Company, of Pittsburgh, has practically absorbed the American Brake Company, of St. Louis. The American manufactures a steam driving-wheel brake for engines with reverse action to that of the Westinghouse, and railroads have already adopted it. The American Company also hold a patented improvement of the air brake to facilitate the exhaust of air and to hasten the departure of trains. Under the new arrangement the American Company will confine itself to the manufacture of steam brakes, the Westinghouse taking the improved air brake. The American is capitalized at \$2,000,000, on which the Westinghouse Company guarantees 5 per cent. On the \$60,000 bonds issued by the American Company to secure working capital the Westinghouse Company guarantees 6 per cent.

The Leechburg Foundry and Machine Company, Limited, of Pittsburgh, whose works are located at Leechburg, Pa., are now about completing the placing of their new machinery. After being burned out, this company increased its capital stock from \$50,000 to \$75,000, and are placing the finest machinery that can be gotten.

F. N. Armour has been appointed manager of the C. & C. Electric Motor Company's Western office, which is located in room 6 of the Adams Express Building, Chicago. The main office of the company is at 88, 90 and 92 South Fifth avenue, New York. They manufacture electric motors from one-eighth horse-power up for general manufacturing and mechanical purposes, also the C. & C. portable battery motor. The establishment of the Chicago office has been the means of introducing these motors more extensively in the West, where they have been found to meet a hitherto unsupplied demand for a cheap engine.

The U. S. Rocking Grate Bar Company have removed their office from 154 Lake street to 187 Dearborn street, Chicago. Samuel S. Chisholm is now secretary and manager. He has recently issued new price lists and descriptive circulars. The list of establishments into which this grate

has been introduced is very large and constantly growing. The construction of the grate is such as to secure a differential movement when the lever is worked back and forth, some bars moving through the arc of a larger circle than the others. It is claimed that this movement drops the ashes, clinkers and cinders from the under surface of the fire without disturbing the burning mass and dropping any unconsumed coal. Cast-iron saddles are set on the bars, and they alone come in contact with the fire. When burned, they are easily removed and renewed.

Among those burned out by the destruction of the Pyreon Art Tile Works, at Sing Sing, on Sunday last, were Abram Kipp's brick-making machine shop; loss, \$85,000, and Hiram Rickey, manufacturer of patent baking pans.

Edison's foundry, at Schenectady, was destroyed by fire on Saturday; loss, \$32,000. All the patterns were consumed.

The Grant Locomotive Works, at Paterson, N. J., are in full operation. A great deal of work is being done for the Erie Railroad, and this, with recent orders, will keep the present force of workmen busily employed for six months to come. The company contemplate the removal of their works to some point in the West not yet determined upon. Recently, in view of this purpose, the force of workmen was reduced, but heavy orders compelled the re-employment of as many of the old hands as could be secured. This temporary slackening of work was in some quarters misunderstood to mean that the works were to be closed. As a matter of fact, the company were never more prosperous than now, and nothing is more remote from their plans than a retirement from business. On the contrary, in their new field the company's operations will be extended with a plant that is intended to be the most complete in the country.

The Lewis Foundry and Machine Company, Limited, of Pittsburgh, last week shipped to Trinidad, Col., a considerable part of the new rolling mill to be erected there. The whole will be completed within four or five weeks. This firm had the contract for the entire plant, excepting foundations and building. They now have in hand another new mill, for Alabama.

Manning, Maxwell & Moore, 111 Liberty street, New York, have recently furnished to the Chicago, St. Paul, Minneapolis and Omaha the following tools made by the Pond Machine Tool Company, of Plainfield, N. J.: One 36 x 36 inch planer, with bed 10 feet long; one 18-inch and one 28-inch lathe; also one 13-inch Niles Tool Works slotter. The planer was placed in the St. Paul shops of the company, the 18-inch lathe in the Altoona, Wis., shops, and the slotter and 28-inch lathe were sent to the Sioux City shops.

The Union Stone Company, of Boston, Mass., write us as follows: "We have secured the business of J. W. Dennis, of Buffalo, and the inventions of Mr. F. A. Shoemaker, in center grinders, Universal Travers grinders, cutter grinders, and patent belt shifter, and have several new machines that will soon be ready for the market. Trade we find quite good for time of year—in fact, we are six weeks behind orders on emery-wheels and machines. Mr. F. A. Shoemaker is in our employ as salesman."

The Bed Rock Emery-Wheel Works, formerly of Bainbridge, N. Y., are now located at Gloucester, Mass., and are known as the Bed Rock Emery-Wheel Company.

Curtis & Curtis, of Bridgeport, Conn., manufacturers of the Forbes patent die stock, pipe cutting and threading machin-

ery for hand or power, have just moved into their extensive new works. Notwithstanding that they have now over three times their old capacity, they are already running overtime with all the men that they can run.

Within a year Messrs. William Tod & Co., of Youngstown, Ohio, have sold Porter-Hamilton engines aggregating about 3000 horse-power for wood-pulp grinding. Recent orders are for 500 horse-power from the Kokomo Wood Pulp Company, and 750 horse-power from the Westmoreland Paper Company. They are also building a 700 horse-power compound engine, with surface condenser, for the California Electric Light Company, of San Francisco.

Hardware.

West Lebanon Rolling Mill Company, Lebanon, Pa., are busy in all their departments and running full force. In the chain works they have several contracts with the United States Government for heavy cables for use in the navy. These aggregate over 100 tons.

The Lambert & Bishop Wire Fence Company, of Joliet, Ill., shut down their works on the 21st ult. for repairs and alterations. They will probably remain closed for three weeks. When they start up again a reduced scale of wages will be adopted. The low prices of wire have rendered the cut in wages necessary, in order to decrease the cost of production. The force of workmen were notified of the intended reduction in wages when the works were shut down, so that they might seek employment elsewhere if they concluded not to accept the terms proposed. A report has been circulated that the reduction was 33½ per cent., but this is incorrect, as in no case is such a heavy decrease contemplated. Care has been taken in the arrangement of the new schedule to enable every workman to earn good living wages.

The Wichita Wire Nail Company are building a brick factory, 40 x 300 feet, with a front projection 16 x 40 feet. The engine-room will be 30 x 40 feet, and one story high, the balance being two stories high with basement 137 feet long under one wing. The capacity of the works will be between 20 and 40 tons of nails per day, in the keg. The company will draw their own wire.

The Tuthill Spring Company, of Hammond, Ind., have long made springs for baby carriages. They have now made arrangements to add the manufacture of wheels and axles also, having bought the entire outfit of the Metallic Wheel Company, of Terre Haute, and the patent controlled by that company.

The strike in the barb department of the Freeman Wire Mill, East St. Louis, inaugurated six weeks ago on account of a reduction of wages, has been declared off, a compromise having been effected.

Miscellaneous.

The Pullman car shops, at Detroit, at the present time are employing over 700 men. The works are running almost to their full capacity, and have not been so rushed with new work for several years.

Rowell & Co.'s plow works, at Hartford, Wis., were burned on Saturday; loss, \$25,000.

The Fuel Gas and Electric Engineering Company, of Pittsburgh, have a contract to put in a fuel gas plant at Salem, Ohio. The city council has granted franchises to a local company capitalized at \$150,000 to operate the plant and furnish gas for heating, illuminating and power purposes. The plans are now being prepared and work will begin as soon as possible.

The Iron Age

New York, Thursday, August 2, 1888.

DAVID WILLIAMS, - - - PUBLISHER AND PROPRIETOR.
CHAS. KIRCHHOFF, JR., - EDITOR.
GEO. W. COPE, - - - ASSOCIATE EDITOR, CHICAGO.
RICHARD R. WILLIAMS, - - HARDWARE EDITOR.
JOHN S. KING, - - - BUSINESS MANAGER.

What is a Reasonable Rate?

The shipping public will take much interest in the case of the Granger railroads against the Iowa Railroad Commissioners, now proceeding. It will be remembered that the Iowa Commissioners promulgated a State tariff which the railroads would be forced to accept and put in use. The company officials found the rates named to be below any previous tariff and below what they considered cost of transportation and a fair profit. At first no way seemed open but to accept the situation. The very name commonly used to describe the railroads affected—Grangers—recalls the fact that in the struggle against the power of State governments to regulate railroads and their tariffs the farmers' granges won a complete victory and settled the question whether our transportation lines were or were not subject to State control. So the attorneys turned to the equity of the case and proposed to show that the rates as arbitrarily established by the Iowa Commission were not reasonable. To prove this they subjected the commissioners to a severe examination, with the result of showing that the proceedings of that body were irregular, and that the reasoning by which many of the changes were made was unsound. One of the commission, under pressure of close questioning, said a rate might be reasonable even though it did not pay operating expenses.

It has been a grievance of long standing with some of our prominent merchants, that while in rate-making there were two parties in interest, the carrier and the shipper, but one of these had the authority, the other generally not being consulted. It must be confessed that the grievance had a foundation in fact. The Iowa Commission, however, reverse this position, the railroads in this case being ignored. The latter case is further complicated by the fact that apparently the judges do not understand the principles of the matter upon which they attempt to pass judgment. It is evident that the solution of our transportation problem is not to come by our adhering to either of these extreme theories. When we examine closely into the matter and follow out our reasoning, we find that we are compelled in the end to choose between two principles: We must rely upon competition, or must have organized and competent regulation by Government. The former plan, which is the basis of the national Interstate law, discourages pooling and even association among railways, upon the assumption that the public will find its best protection by the same strife which we are accustomed to in mercantile affairs. The danger of this plan lies in the essential differences between running a store and operating a railroad, and in such an exaggerated competition as will defeat its own ends and de-

moralize commerce. On the other hand, the theory of exact regulation by Government involves grave questions. Would it be consistent with our form of government? Would it be possible to keep such a department out of the hands of politicians? Certainly the times are not yet ripe for such an experiment. Meanwhile, it must be said that such proceedings as those of the Iowa Commissioners only complicate matters. Undoubtedly there are charges against the Iowa railroads which are true, and items in the classifications and tariffs which should be altered, but the Iowa men, judging from reports of the case, do not seem competent to overturn everything and do it justly. Certainly we should not have Governmental regulation of railroads by any agency which has not knowledge and experience coupled with common sense.

Judge Brewer's decision complicates matters. He holds, in continuing the temporary injunction against the Iowa Commissioners from enforcing the schedule of rates recently adopted, that while legislatures have the right to delegate authority to make rates the latter must be "reasonable." The meaning of this term is declared to refer to rates which will enable a road to earn not only operating expenses, but also fixed charges, and something, however small, in the way of dividends. Only a day or two ago this position was reaffirmed in the Minnesota case.

It is on this very point that the difficulty hinges. We feel convinced that shippers and the public at large will not for any length of time withhold from investors a fair return on the capital actually expended in construction over and above the sums needed for maintenance and improvement. The trouble is that few are willing to take the word of railroad managers for the accuracy of the statements covering cost of building, equipment and terminals, and the possible losses incurred at different times. We are inclined to believe fair-minded men will go even further, and will admit that those who have put their money into railroad enterprises are entitled to compensation in the way of extra profits for the risks taken in embarking upon uncertain ventures. But the public knows that it is paying profits on an enormously inflated capital—that in the majority of cases the returns are made to appear very much smaller than they really are on the actual money invested. We doubt whether the agitation will cease until the conviction is reached that the water has been squeezed out of stocks and bonds, or at least has become ineffective as a pretext for excessive compensation.

In the meantime it is clear that there is as much danger to a good cause from unrestricted power of State and national commissioners governed by political motives only as there is in the abuse of power by railroad managers.

The policy of offering bounties to manufacturers to induce them to locate their shops in certain towns has worked well in numerous instances. Towns now noted for their enterprise and the extent and variety of their trade have first been brought into prominence by their liberality in this respect. There are many ways of paying such bounties, however, and to some of them serious objections have been found. One of the easiest

ways to raise a bounty is by levying a tax on all the citizens by vote of the town authorities. As all classes of property are presumed to be benefited by whatever conduces to the increased prosperity of the town, it would seem to be both reasonable and proper to make all contribute their share to such a commendable object. Small taxpayers do not usually object to this method of raising funds to "boom" the town, but the large taxpayers often protest against it, as they are obliged to bear the greatest part of the burden, which is apt, in their eyes, to obscure from view the larger benefits they will derive. Last week a case of this kind was brought up before a Michigan court for legal decision, some heavy taxpayers of Trenton, Wayne County, denying that the Village Board had authority to vote a bounty to a stove foundry now being erected there under this inducement. In itself this particular case is not of great importance, but if the courts decide against the legality of the tax it will affect many other towns in the State in which the same thing has been done to a greater extent. The taxpayers in those towns also protested at the time, but did not institute legal proceedings to ascertain their rights. They will probably not hesitate if the way is now open to them to demand restitution. Obviously, the safest way to raise a bounty is by voluntary subscriptions, rather than by taxation. The legality of such a method would never be questioned.

Discontented Iron Molders.

It seldom happens that labor organizations give employers much time to consider demands which are to be enforced by strikes if not conceded. The Iron Molders' Union of North America, recently in session at St. Louis, has made a notable departure in this direction. The members of that body have concluded to demand a reduction of their daily hours of employment to nine, and name April 1, 1889, as the date on which the proposed change shall go into effect. This gives the employers eight months' notice, which is certainly ample time for consideration and preparation, and will afford sufficient opportunities for the reconsideration and abandonment of the demand in case the molders themselves should become convinced by intervening circumstances that it would be inexpedient to press it. Their conservatism in this respect is worthy of imitation by other bodies of workmen. There are many reforms sought by those whose labor is their only commodity that might be accomplished through quiet discussion and prolonged agitation, which are wrecked by attempts to suddenly force them upon employers. It is true that strikes seldom occur until a conference has been sought and the demand has been made and refused. Instances are rare in which no discussion of a grievance or a proposed reform has been had before workmen lay down their tools. But the time devoted to such a discussion is too often very limited.

The reduction in hours of employment proposed by the Iron Molders' Union is a radical change which needs to be very thoroughly discussed by those directly interested before they attempt to compel employers to adopt it. The statement is

made that the members of the union themselves who were present at the St. Louis meeting were by no means united in support of the proposition. A strong opposition to it was developed, and it was carried by a bare majority. The conservative element evidently knew that many employers would resist to the bitterest extremity an attempt to establish a nine-hour day for molders, and that the enforcement of the demand merely meant a long period of idleness with probably no compensating benefit. They recognized the fact that in many works the molders constitute but a part of the employees, and that the molders' day could not be cut down to nine hours while the mechanics in other departments worked ten hours. Agricultural implement works, machine shops, engine works and similar establishments might be forced to adopt a uniform nine-hour day for all their departments if the molders were granted the proposed reduction. This would necessarily curtail production and increase cost, while the tendency in every branch of industry in late years has been to decrease cost as much as possible.

The partial success which workmen in the building trades have scored in various parts of the country, in establishing a shorter working day, has probably influenced the molders, who were instrumental in committing the union to the support of the demand for a nine-hour day. They reasoned that if carpenters and bricklayers, plasterers and hodcarriers, masons and roofers worked only eight hours a day, and their employers were gracefully accepting the situation, there was no reason why molders should work ten. In their opinion the reduction of but one hour asked for is a very reasonable demand, when the building trades have secured a reduction of two hours. If they had studied the matter further, however, they would have found that the eight-hour day is by no means general among the building trades of the country, that where it is most strictly enforced building operations are severely contracted as compared with previous seasons, and that the impression prevails among the best-informed mechanics that the eight-hour movement was a mistake, to be atoned for as long as the short day exists, and to be corrected before another building season opens if constant employment is desired. This is particularly apparent in the eight-hour cities of the West.

The iron founders of the country have further been advised by the union as to the plan of campaign. The statement is published that if the demand for a nine-hour day is not conceded strikes will be ordered in the smaller shops, and as rapidly as they yield the contest will be extended to the larger ones. It would be singular, indeed, with the plan thus outlined, if the larger founders would not make preparations to stand by their fellow-founders and precipitate a general engagement in which the full strength of the molders' organization would be tested. Of course there are many foundries in which this issue will not come up under any circumstances, the molders being paid by the piece and not by the day. As soon as their usual daily task is ended they quit work, whether they have been engaged for eight, nine or ten hours. The stove foundries and others making specialties come in this class. Their mold-

ers, however, would form a very strong element of support to the union in case the threatened strike should develop.

Judging from the fact that the wages question is not to be made an issue, it would seem that the molders are not disposed to find fault with the rate at which they are paid for their work. If this inference is correct, it is unfortunate that they should permit themselves to be made to appear discontented by the demand made in their name for shorter hours. They are now working but the customary day for those engaged in mechanical pursuits, and they are suffering no hardships beyond the lot of their fellow workmen. Eight months of good, solid, serious reflection will probably bring them to this conclusion and dissipate all danger of an issue coming forward from their branch of the industrial army to derange business in the spring of 1889.

The Trade of British India.

We extract from the annual report of Mr. J. E. O'Connor, Secretary of the Indian Office, for the fiscal year 1886-87, recently published, and the "Statistical Tables for British India," Calcutta, 1887, some data bearing on the progress which that country has made of late years, from an agricultural and commercial point of view. The last census was taken on February 17, 1881, when the population was 253,891,821 to an area of 1,382,624 square miles. The railroads in operation have increased from 5077 miles in 1871 to 12,376 in 1886. Their earnings in 1885 were £18,034,465; the expenses, £8,945,283, leaving the net earnings £9,089,182.

The cotton crops have fluctuated in yield a great deal, as the following figures, covering five years, will show:

	Acres under cultivation.	Outturn of cleaned cotton. Cwt.
1880.....	10,708,002	5,237,845
1881.....	11,204,630	5,081,719
1882.....	12,924,196	6,565,456
1883.....	13,851,179	7,227,992
1884.....	13,352,536	4,472,550

The cotton industry has meanwhile developed in a remarkable manner. In 1878 there were in operation 53 factories, with 1,289,706 spindles and 10,533 looms, the value of twist and piece goods exported being 10,543,630 rupees. In 1887 the number of factories had reached 94, with 2,261,561 spindles and 17,455 looms, the amount of export being 42,189,130 rupees. The shipments went to China, Japan, the Straits, Eastern Africa via Aden, and Persia.

The number of coffee plantations has varied between 1887 and 1885 between 38,682 and 47,978 as extremes, there being 44,985 in the latter year, while their product fluctuated between 24,462,453 and 42,932,437 pounds, the yield of 1885 being 34,959,295 pounds. Greater impulse has been given to tea cultivation than to any other agricultural pursuit. The number of plantations was 2330 in 1878, when the area under cultivation was 199,132 acres, and the product 39,183,667 pounds; in 1885 there were 3578 plantations, having under culture 283,926 acres, which turned out no less than 71,520,800 pounds. The great object in view was to supersede Chinese tea among English consumers through good quality combined with cheapness. This process has been going on so steadily

and successfully that after a couple of years no Chinese tea may be used in England.

Indian wheat has qualities which recommend it for certain uses in Europe; it is, for example, as dry as a bone, and hard, hence it is well adapted for mixing with certain species of European wheat, and for Italian macaroni the flour from it has no rival. Last year's crop has not been up to the average, and the yield of the present crop is threatened by want of rain. Shipments to Europe during the first half of the present year compare with the corresponding period in 1887 as follows in hectoliters:

1888.			
	To Eng-land.	To the Con-tinent.	Totals.
From Bombay.....	1,479,000	2,673,800	4,152,800
" Kurrachee....	237,800	92,800	330,600
" Calcutta.....	872,900	136,300	1,009,200
Totals.....	2,589,700	2,902,900	5,492,600
In 1887.....	3,520,600	3,680,100	7,200,700

The indigo crop is suffering from drought in Bengal and Behar; the arrivals of Bengal, Kurpah, and Madras indigo in London during the first six months have been 16,928 chests, against 15,707 in 1887 and 18,284 in 1886. Even brewing has taken a start in India. The number of gallons made in 1879 was only 1,569,026; the amount has more than doubled since, being 3,150,342 in 1885.

The importation of the precious metals into India has diminished; in 1860 to 1873 gold importations reached the aggregate amount of 726,062,000 rupees, whereas the total from 1874 to 1887 did not exceed 348,306,000 rupees; the amount of silver received was respectively during the periods named 1,172,242,000 rupees and 915,811,000. Mr. O'Connor expresses the opinion that the ancient habit in India of hoarding gold and silver is gradually on the wane. The result is that amounts long withheld from circulation in that manner emerge from their hiding places and swell the coin in actual use. In other words, India has ceased to figure among nations as a continual absorber of the precious metals, which is an important fact in connection with the silver question.

The foreign trade movement in India, in thousands of rupees, is shown in the statistics given below:

Merchandise.		
	Import.	Export.
1882-83.....	634,562	843,817
1883-84.....	655,819	891,029
1884-85.....	670,282	850,879
1885-86.....	672,893	849,157
1886-87.....	607,148	901,133

Specie and Bullion.		
	Import.	Export.
1882-83.....	134,532	9,809
1883-84.....	128,780	9,816
1884-85.....	138,788	18,873
1885-86.....	154,778	10,878
1886-87.....	110,533	16,845

Specie and Bullion. Excess of Import over Export.

	Gold.	Silver.
1882-83.....	49,308	74,803
1883-84.....	54,025	64,052
1884-85.....	46,719	72,456
1885-86.....	27,629	116,066
1886-87.....	21,771	71,557

The foregoing tables demonstrate that India is a country in which the export steadily exceeds the import despite the large amounts of railroad and telegraph material that have to be ordered from abroad year after year. It is due to the fact that the bulk of the people, while

being laborious in the field and producing a vast amount of raw material, have not got money enough to buy more than what is strictly necessary.

The Foreign Trade Movement in 1886-87, Reduced to Thousands of Rupees.

Import.	Export.
Sugar..... 20,805	Rice..... 87,648
Beer..... 3,540	Wheat..... 80,259
Liquors..... 7,706	Tea..... 47,280
Wine..... 3,331	Coffee..... 15,023
Provisions..... 11,795	Spices..... 6,122
Salt..... 7,090	Sugar..... 5,048
Spices..... 6,638	Tobacco..... 1,196
Tea..... 3,243	Cotton..... 134,684
Coffee..... 586	Wool..... 8,906
Tobacco..... 1,105	Silk..... 4,843
Silk..... 7,934	Jute..... 48,698
Cotton..... 1,180	Hides..... 51,492
Coal..... 13,106	Saltpeter..... 3,761
Petroleum..... 12,600	Seeds..... 91,986
Cotton twist..... 33,184	Opium..... 110,777
Cotton goods..... 253,558	Indigo..... 36,917
Woolens..... 15,289	Oils..... 4,588
Silk goods..... 13,711	Twist..... 33,369
Metals..... 46,891	Cotton goods..... 8,783
R.R. material..... 14,351	Jute goods..... 11,519
Machinery..... 13,715	Silk goods..... 3,147
	Woolens..... 859
Total..... 491,018	Total..... 802,905

The above trade was distributed as at foot:

	Import.	Export.	Total trade.
England.....	467,695	342,982	810,677
China.....	21,880	134,339	156,219
France.....	8,035	77,230	85,265
Italy.....	4,255	52,792	57,047
Straits Settlements.....	15,905	41,546	57,451
United States.....	11,703	32,481	44,184
Belgium.....	2,953	36,086	39,039
Austria.....	7,239	26,394	33,633
Ceylon.....	5,378	18,902	24,280
Mauritius.....	16,565	8,815	25,380
Persia.....	5,627	13,599	19,226
Arabia.....	3,172	10,830	14,002
Australasia.....	3,921	5,283	9,204
Zanzibar.....	3,921	4,675	8,596
Aden.....	803	7,159	7,962
Germany.....	1,603	7,846	9,449
Turkey.....	1,799	4,705	6,504
Totals.....	583,454	825,664	409,118

American Trade.

Fiscal years.	Import into the United States.	Domestic export.
1878.....	\$12,081,595	\$846,908
1879.....	12,225,770	1,142,196
1880.....	21,022,854	2,218,190
1881.....	18,012,206	858,069
1882.....	18,057,913	3,054,787
Totals.....	\$81,400,338	\$8,160,240
1883.....	\$19,467,800	\$2,185,611
1884.....	19,550,458	3,711,259
1885.....	17,690,257	4,103,675
1886.....	17,247,825	4,350,141
1887.....	18,836,090	3,902,047
Totals.....	\$92,801,430	\$18,252,733

The foregoing tables show that good headway has been made in both directions.

Electric Motors.

Electric motors for low power purposes are becoming more and more prominent. In connection with our recent brief reference to their position in the list of domestic motors, it is of interest to note that they are now made to be operated either by a small battery of a few cells or by a current from an electric light wire, and are capable of successfully performing work for which steam-power would be objectionable. For some years the manufacture of electric motors was in an experimental stage, as usual in the opening up of all new enterprises, but by this time the difficulties seem to have been overcome, and those desiring to use electric motors have a number of patterns from which to make a selection. Prices also have become more reasonable, with increased competition and the progress toward greater perfection made through the in-

creasing attention given the subject. The motors can be started, stopped or reversed by a small lever, which instantaneously controls the motion. Jewelers' and dentists' lathes and drills and similar delicate machinery need a motor of this character, which not only operates at a high rate of speed, but can be instantly stopped and reversed if desired. Sewing machines are a class of machinery to which these motors are well adapted. The battery is placed in the cellar or in a closet out of the way, from which wires convey the current to the motor placed on the table of the machine. It is always ready for use, and when not actually in use it requires no attention to keep it in order beyond an occasional recharging of the battery. Pumping machinery for domestic supply in suburban towns is another field to which these motors can easily be employed, with great comfort, benefit and convenience, as any resident of suburban districts can testify who has been obliged to pump by hand.

The great advantage an electric motor possesses is its adaptability over a wide range of uses for power. While it can be made sufficiently large to take the place of a steam engine of comparatively high power, with economy it can also be made small enough to operate the most delicate machinery, requiring but a small fraction of a horse-power. The isolation of motors is another advantage. They can be placed just where they are needed, no shafting being required for the small motors, the attachment being made directly to the machine to be operated. This will be appreciated by a large class of manufacturers operating special machinery, which is run irregularly and without regard to other operations in the same factory. With the extension of electric light service, the more general introduction of these small motors would seem to be inevitable, their value being already widely appreciated.

Foreign Commerce and War Ships.

In the volume entitled "War Ships of the World," recently issued by the Committee of Lloyd's Register of Shipping, at London, statistics are given showing the merchant shipping and commerce of the principal countries in relation to their respective war navies. The tables inform us that the value of the British merchant navy is about \$465,000,000; that of France being about \$45,000,000; of Germany, \$47,500,000; of Italy, \$21,000,000; and Russia, \$10,000,000. The total British annual imports and exports amount to \$3,090,000,000, of which \$700,000,000 are paid for food. The annual trade of France is valued at \$1,490,000,000, of which \$250,000,000 are for food. Germany has a total annual commerce valued at \$1,465,000,000, of which only \$125,000,000 are expended in food; while of the total exports and imports of Russia, which amount to \$405,000,000, only \$35,000,000 are paid for her food purchases. Associated with these figures, we find that Great Britain has 63,000 tons of merchant steam tonnage to each cruiser or sloop; while France has 12,000 tons; Germany, 24,000; Italy, 13,000, and Russia, 6300. Of merchant steamers to each war vessel capable, of steaming 14 knots, we have 62; France, 7; Germany, 18; Italy, 4, and Russia 10.

The State Mine Inspector of Iowa reports the output of coal in that State in 1887 at 3,864,490 tons, which is about the average production of the past five years.

CORRESPONDENCE.

"The Mission of Mechanical Engineering Schools."

To the Editor: After perusal of the extracts from the presidential address before the Alumni Association of Stevens Institute on June 13, 1888, given in your issue of July 19, as the author of the paper therein referred to I feel it incumbent, somewhat in my own defense, to reply briefly thereto. I quote from the address:

Should every new, important mechanical device, especially if it brings with it new fields of practical employment and labor for the engineer, immediately find its place as a study in the engineering school?

If this be so, the school of mechanical engineering will have to extend its term of study an indefinite extent, and ere long it will come to pass that the young student entering as a beardless youth will graduate from the school as a gray-haired man in the decline of life. For surely if every important machine is to be the subject of special study in the technical school a lifetime will only suffice to cover the ground. And the result?

The result would be that the engineering schools would be of no use in the world, for the world's engineering work would be being done by outsiders, while the gray-haired students, plodding along, would be kept busy studying this very work and not be active agents in its development.

And from the paper:

The steam engine and the printing press have long been held up as the two great civilizers, as the two fields of human effort, to the cultivation of which the extraordinary progress made in human affairs in the nineteenth century is principally due.

Of course among the vast variety of special fields of mechanical study it is not to be expected that in the college course any particular attention can be given to more than a very few of the most prominent subjects, and we very properly find among them the steam engine. * * *

The printing machine of to-day certainly deserves a higher place in our schools as a specialty in applied mechanics than is indicated by the foregoing.

Now, while the writer would not counsel the abandonment of any of the above-quoted specialties of mechanical engineering to give place to the printing machine it would seem, in view of the acknowledged comparative importance of the latter, that it should have a place among them, even at the expense of a portion of the time devoted to some of them, and possibly (bearing in mind that in the time allowed the total quantity of this kind of study must necessarily be limited) to the exclusion of some of the least important.

Now, it will be quite evident, I think, upon examination of the quotations above that the author of the address ignores almost entirely the major premises in the paper, which are:

1. That only a certain fraction of the student's time can be profitably given to the study of special applications and their theoretical acquirement.

2. That the printing machine, as one of these specialties, has been second in importance only to the steam engine—at least until the comparatively recent development of electrical science, and that now it probably is not below the third place.

3. That a considerable number of special studies of less importance than the printing machine, which are enumerated in the paper, do now, and have heretofore, formed a part of the curriculum of the technical schools.

4. That it would be in the interests of the student, and the best form of efficiency for him at graduation, that less time be expended upon the newer and less important special studies in favor of the older, heretofore totally neglected and more important printing machine.

I submit, then, that the address, so far as it is a criticism of the paper, cannot be said to stand on very solid ground.

The writer fully appreciates and cannot but admire the spirit which prompts the alumnus to defend at every point his Alma Mater. It can hardly be said, however, I think, that the address in this instance

recognizes fully that she can best be defended by increasing her strength, and that she would be strengthened by substituting an important for a less valuable study, which, without expending any additional time on this particular kind of investigation, is what the paper advocates.

It is too common a practice, I fear, in discussions of this kind, where opposing arguments are not easily refuted, to set up men of straw, in the absence of the real antagonist, to exhibit the disputant's prowess in knocking them down again. The quotations show, I think, that the author of the address has made himself amenable to this charge in a very marked degree.

JOHN T. HAWKINS.

TAUNTON, MASS., July 23, 1888.

The Tin-Plate Duty.

CHICAGO, July 30, 1888.

To the Editor: The truthfulness of the familiar aphorism, "Every man has his own axe to grind," is daily being verified, an instance of which occurs in connection with the consideration of tariff on tin plate, if the exposition of intent which actuated the deputation of American sheet-iron makers, who have just given evidence before the Senate Committee on Finance, is correct, as is attributed to them in your editorial. It is therein intimated that the agitation displayed by this body of manufacturers at the possible abrogation of tin-plate duty arises from the fear, solely, of destruction to their sheet-making business, and are not actuated by a desire for a suitable tariff with any view of prosecuting tin-plate making in America.

I am glad to see the suggestion you throw out, that these gentlemen should subscribe capital to erect and operate a tin-plate factory, and thus practically demonstrate the necessity of increased tariff for the profitable working of this industry, or the probabilities are that the little duty tin plate already carries will be ultimately wiped out and the matter closed.

With a duty of 50 per cent. more on iron sheet than on tin plate, we know that while it is profitable to manufacture black sheet it is a certain loss to attempt that of its more advanced product in tin plate. By an array of figures we can show the absolute necessity of a specific duty, sufficiently definite and conclusive to any one with even a slight knowledge of the business; but it would seem that we have to incontestably prove to the satisfaction of legislators, by actual performances, what amount of duty should in their estimation be accorded to it, so that the industry may be retained and encouraged, before any prospect of assistance may be expected; this, therefore, is evidently the proper course to pursue, providing, indeed, the Senate now refuse to place tin-plate duty on an even plane with duties imposed on iron and steel sheets, and which in strict business is only natural we should expect from Republican protectionists, having the welfare and development of the country as the apex of their aims and motives. The sheet-makers will start out with a knowledge of incurring a loss on manufacture; it is for them to sustain this tin-plate making loss, if, by so doing, they protect their sheet business from present destruction and ultimately establish the manufacture of tin plate on a paying basis.

If sheet making is worth retention, evidently something more must be done by makers than calling upon Jupiter to pull them out of the mud hole. It is of no use saying that the matter has been already proven from the fact of the works which had started out to make tin plates, years ago, having closed down from inability to compete with imported plates upon the reduction of tariff, as the conditions of manufacture are so entirely dissimilar then and now as to preclude any

contrast—improved machinery, new appliances and inventions wherewith manufacturing costs are so considerably reduced, affording no criterion for formulating comparisons and deducing any results therefrom. Yours faithfully,

WILKINS TRICK.

Washington News.

(From Our Regular Correspondent.)

WASHINGTON, D. C., July 31, 1888.

The divided opinions of the Republican Senators were very suddenly harmonized a few days ago, when it was discovered that it was the President's purpose, should Congress adjourn without action on the tariff in the Senate, to make that a ground for calling the legislative branch forthwith into extra session. It was his intention to give the non-action of the Senate and their disposition to evade the responsibility of the tariff revision and revenue reduction marked prominence in his official summons. When the differing Senators suddenly had their eyes opened to the fact that they were running their heads into a campaign noose they hastily called a caucus, which was held at the residence of Senator Evarts. There were 31 Republican Senators out of the 38 present.

The principal speech of the caucus was made by Senator Allison, who pointed out that not to take any direct action would subject the Republicans to the imputation of being afraid to meet this issue. He also called attention to the determination of the President to reassemble Congress should that body adjourn without action. The wavering Senators were soon brought into line, and, by unanimous consent, the Committee on Finance were authorized to formulate a bill, report it and endeavor to secure its passage. Since this determination the Senate Sub-Committee have continued their work on their bill with renewed vigor.

The features of the bill as it progresses do not materially vary from what has been stated in *The Iron Age*, giving the general outline of the measure as laid down by the committee in their preliminary discussion of the subject. No action has been taken under any of the schedules without a full and free consultation with parties representing such interests and by voluminous correspondence with others. The most important reduction is on steel rails, from \$17 a ton to 7-10 cent a pound. There will be no change in tin plates nor in cotton ties from existing rates. The Republicans of the committee are disposed to place the tin-plate industry on a footing which would afford American capital and enterprise an opportunity to enter that important branch of manufacturing energy, but they claim that this would be a most inopportune time to do anything which would have the appearance of increasing duties. If the people, by the verdict of November on the issue as now presented by parties, should place their unequivocal condemnation upon everything which even squints toward free trade, the party in power would feel justified in embarking in tariff revision on the theory of full protection to every branch of American industry. As Senator Allison expressed it, the present work of the committee is to provide a measure of revenue reduction with as little interference as possible with existing legislation, which would disturb the industrial interests of the country. The plan of the committee is, therefore, to take as much off the internal revenue taxes as possible, and the rest off sugar and alcohol used in the arts. On the removal or reduction of the sugar duty there are some Republicans who are disposed to raise objection; the sorghum interests of Illinois and several other Western States are not favorable to this proposition. They

may be able to bring about some arrangement by means of which this may be modified. There is also an objection to any change in the duty on salt. These important interests in New York are opposed to the House bill, which places salt on the free list, and they warn the Republicans of the Senate against committing a similar error.

The members of the Sub-Committee on Finance are making no special haste to report their bill, as there are several appropriation bills to be disposed of. Another fiscal year expires to-day. It is expected that the Sub-Committee will report their bill to the general committee during the present week. It may not be reported before next week, when a day will be fixed to take it up for discussion until disposed of.

The House is renewing its antagonism to the fortification bill, and there would be some doubt about making any appropriations except for preservation of existing works and armament if it were not for the influence brought to bear upon the Representatives of certain sections, notably those of the great sea coast cities. The Watervliet gun foundry scheme is having a somewhat varied experience. It started in the Committees on Coast Defenses of the Senate and House and next was brought up in the Military Committee and also had been proposed for action in the Sundry Civil bill. General Tracy has followed this question up with great industry and zeal. As the foundry would be located in his district he does not propose to get left if he can help it.

A Large Lake Steamer.—A 2700-ton steamship was launched on the 28th ult., at Reebolt & Walter's yard, Sheboygan, Wis. The new boat will form part of the Milwaukee fleet. In its construction 950,000 feet of timber were used, all of which but 50,000 feet came from Arkansas and Kentucky. Forty-five tons of steel plates, 35 tons of spikes, and 120 tons of round iron were also used. The total cost of the steamship will be \$140,000. The dimensions are as follows: Keel, 276 feet; length over all, 299 feet; beam, 40 feet; molded depth, 26 feet. Both decks are of 3-inch Georgia plank. There are steel cords running in a straight line from forward to aft inside and outside just below the plank-sheer. A steel cord 60 feet long also runs from upper plate down to fore-foot. Another steel cord, $\frac{3}{4}$ x 4 inches, runs diagonally from center to sides, and is embedded in the deck beams. Still another steel cord, $\frac{3}{4}$ x 10 inches, runs under the rail on the outside around the entire boat from stem to stern, between every larch of which there are 84 $\frac{3}{4}$ x 4-inch steel bars running diagonally from center to sides and embedded in the deck beams. The boat is given four spars, with topmasts, and will carry a jib, being the only steamship on the lakes having one. The officers' quarters are commodious and handsomely finished in cherry and antique oak. The engine is triple expansion. The high pressure cylinder is 20-inch bore, the intermediate, 32-inch bore, and the low pressure, 54-inch bore and 42-inch stroke. The boilers are of Scotch type, 11 feet shell and 12 feet long. She has a 13-foot wheel, with a 15-foot lead. The boat is fully equipped with steam-steering gear and other labor-saving appliances.

H. H. Hartman, president of the Hartman Manufacturing Company, of Beaver Falls, Pa., sailed for Europe, on Saturday the 21st ult., on the Cunard steamer Umbria, to be gone about two months. During his absence abroad Mr. Hartman will combine business with pleasure.

A. H. Shipman, inventor of the Shipman engine, died on Monday last, in Geneva, N. Y., of consumption.

"The Crisis in Copper."

Wm. S. Lawson, city editor of the London *Financial News*, has been giving special attention to the position of copper in the world's markets for the past few years, visiting this country twice since 1885. He has just issued a pamphlet, entitled "The Crisis in Copper," which is in the main a reproduction of a series of articles contributed by him to the English press. Among them is one printed in the Edinburgh *Courant* of February 1, 1884, entitled "The Beginning of the Great Fall, 1883," and a second, from the *Times* of August 26, 1885, headed "A Deluge of Copper, 1885," which at the time created a tremendous sensation, and was sharply criticised on this side of the Atlantic.

It is, however, when he deals with the present condition of affairs, and reviews the history of the past six months, that Mr. Lawson's writings are of more immediate interest. The following abstract from an article entitled "The Copper Ring of 1888" is of interest, since it throws some light on the famous syndicate:

What is popularly spoken of as the "Paris Syndicate" is in reality a group of syndicates all working together, but on distinct lines, and without any direct responsibility for each other. The first of them was started so long ago as the early part of last autumn, its members being M. Secrétan and a few of his friends. They were all experts in copper speculation, and, if they are not belied, some of them had a hand in the memorable bear campaign of 1885, which broke the price of copper to under £40 per ton, and produced the doleful situation which M. Secrétan bemoaned the other day in the *Times* and the *Pall Mall Gazette*. Those who watch the copper market closely will have observed that it has a boom almost every autumn. In 1885 and 1886 it was a very mild boom and not long-lived. When M. Secrétan and his friends started in last September, they probably did not contemplate more than the usual autumn flurry. An advance of £5 per ton on copper, and of £2 or £3 per share in Rio Tintos, was, perhaps, the limit of their speculative ambition. Their operations did not, at first, open out very hopefully. They found that they could buy as much copper as they pleased without moving the price appreciably, and they actually secured, in the course of a few weeks, between 30,000 and 40,000 tons, at an average of less than £40 per ton. It was warehoused in London, and financed for them by a bank within a stone's throw of the Stock Exchange.

Meanwhile the rig in tin had reached gigantic proportions and entered on a very exciting stage, the price having been run up in a few months from £105 to over £160 per ton. Accounts vary as to whether or not the Secrétan clique had been engaged in this early maneuver, but the best informed belief is that they were interested in it. At all events, the startling success of the rig in tin first suggested a similar campaign in copper. But the original clique had already their hands full. A new combination was necessary for any large operation, and that, we believe, was not formed till December. Then what may be called the Comptoir d'Escompte syndicate came in. This association did not, as is generally assumed, enter into the gamble, directly or officially. It only supplied from its Board and its *entourage*, financiers of the right sort. No doubt, also, it has found for them the money to gamble with, but they are the gamblers, and not the bank itself. Other financial institutions became parties to the scheme under the same convenient mask. They put no money into it, but they made advances to friends of theirs who wished to go in. In Paris all of them are well known, and quite openly talked about. Next to the Comptoir d'Escompte, the principal supporters of this second syndicate are the Ottoman Bank and the Banque de Paris et des Pays Bas. Its special mission was to engineer a big rise in copper shares, beginning, of course, with Rio Tinto. Here there was more favorable ground to work on than in the copper market itself. Rio Tinto shares were then dirt cheap—in October they had been sold in London as low as 7½—and a huge bear account was open in them on the Paris Bourse. That itself was a splendid lever for the engineers of a boom. The syndicate began buying about 8 or 9, but they did not do this part of the business so skillfully as the capture of the 40,000 tons of copper. Instead of buying quietly and deliberately, taking care not to frighten the market, they went in with a rush, and literally made the shares run away from them. In a little more than a fortnight they had doubled the price and were still buying furiously. Their first 50,000 shares are sup-

posed to have cost them £15 each, and their second 50,000 from £18 to £20. For several days after the failure of the big bear operator, M. Kaltenbach, they bought heavily in order to accelerate his crash, and many of these purchases must have cost them from £20 to £22. Subsequently they lightened the ship of a considerable number of shares; but since then they have always resumed buying when necessary to prevent a bad break.

An ordinary autumn boom in copper rarely lasts more than a month or two, after which the market falls back into its old rut. But, on this occasion, M. Secrétan and his friends did not dare let it take its natural course. Having got their tiger by the tail, they must hold on to him. In order to give the two syndicates time to unload on an unsuspecting public, a third syndicate was needed to prevent the market being flooded with increased supplies of copper, stimulated by the artificial prices the syndicates had created. The bold design was conceived of making forward contracts with the principal copper mines for the whole of their production, one, two, or it might be even three years ahead. The syndicate which had undertaken that colossal responsibility is the most mysterious of the group. All that can be learned about it is that M. Secrétan himself negotiates the contracts in the name of the *Société des Métaux*. So fantastic and grandiose a scheme hardly admits of prosaic criticism, but this much may be said, that a wider transaction is not recorded in the whole history of commerce. The Indian fakir who stands all day swallowing knives and swords has an easy task compared with the Paris syndicates in swallowing the greater part of the next three years' copper production of the globe. They propose to do in real earnest more than Gargantua attempted in burlesque.

Another chapter from the heading "Fallacies of Copper Statistics" is interesting and brings out some points which we believe the American trade does not generally well understand. We quote the following:

Copper statistics are prepared with very great care and ability, but it is impossible to exclude from them a certain amount of guesswork. With experts and people in the trade this does little harm, as it is understood and allowed for; but casual readers will be apt to find their little knowledge of the subject a dangerous thing. For them it is full of pit-falls, example after example of which can be given off-hand.

An English follower of M. Secrétan, on reading the metal report in his morning paper, will be pleased to see that Chili bars are still firm about £81, but he would be grievously mistaken if he assumed that a cartridge maker when he required copper went and bought Chili bars at £81 per ton, or that a smelter in purchasing copper ore paid for it on the basis of Chili bars. Neither of them is such a fool, for he can do much better. The smelter buys what he calls "furnace metal," namely, ore, matte or regulus, £7 or £8 per ton under the Chili bar rate. The latter has, for years past, been a purely speculative standard, and since this copper boom began it has become more so than ever. There is the same difference between it and the current price of manufacturing copper as between the Bank of England rate and that of Lombard street for day-to-day loans. Chili bars form only one-seventh of the total production of the world, and the idea that they determine the price of the other five-sixths is only a popular delusion—harmless enough in a general way, but very misleading in a speculative craze like the present. It would be much nearer the mark to regard them simply as gambling counters. They have little or nothing to do with the trade price of copper, which follows the rates paid by smelters for "furnace materials." All through the recent excitement "furnace materials" have lagged behind Chili bars, and are even yet several pounds per ton below them.

Another pitfall, into which the unwary student of copper statistics may tumble lies in the technical term "deliveries." Even practical men may sometimes be heard speaking about these as if they represented only copper passing into immediate consumption. But ore or matte or regulus going to the smelters is reckoned a "delivery" just as much as fine copper passing into the hands of the manufacturers. The vital difference in the two cases is obvious. Smelters are not, strictly speaking, consumers of copper; they only complete the process of production, and most of them combine with their proper function that of warehousemen. Years ago, when the trade was much smaller, they kept it in a ring fence, being not merely smelters, but merchants and store keepers. They held all the reserve stock; and not only so, but they kept their thumb very firmly on the amount of it. Not a figure or a statistic was ever permitted to leak out

when the old smelters' ring was at the helm. Though now less influential, it is as fond of secrecy as ever. No one in the trade, least of all M. Secrétan himself, has any idea what stocks the smelters have on hand. Thousands—possibly tens of thousands—of tons which have been charged to them as "deliveries," and are supposed to have passed into consumption, may still be in their stores. Whether large or small, their stocks are an unknown quantity in the situation.

"The copper supply" is a very much wider term than they imagine who have undertaken to keep up the price for three years at a minimum of £65 per ton. As we showed before, it comprises old copper, of which there may be thousands of tons quickly available; it includes warehouse stocks, a large portion of which cannot be traced, and is very deceptively treated, as if it had passed into consumption; it is being added to daily by existing mines, which can turn out 270,000 tons per annum, without allowing for any further development. In a few months further additions will be made to it by new mines and old mines reopened. What is to prevent another "deluge of copper" overwhelming the world, as in 1885? If the market could be flooded at £40 per ton, why not at £77 per ton or £70, or even the syndicate minimum of £65? The engineers of the copper corner seem to us to be deliberately challenging such a result. Not only so, but they are working for it with both hands. On the one side they do all they can to reduce consumption, and on the other they are offering bribes for reckless production. Before they know where they are they may have an avalanche of copper on their hands. Already it is coming back from India, one of the world's oldest and largest storehouses of copper. To the Indians copper is almost a precious metal, being hoarded up like gold or silver. Tempted with high prices and their exports will rival those of the Rio Tinto. It would be an excellent business just now for India to exchange inflated copper for depreciated silver. By-and-by, when the copper boom has run its course, and a silver boom is being got up for a change, India may return our silver and take back her copper, making a handsome profit on each.

As bearing on the same general subject, we may quote the following from the next article, on "The Visible Supply of Copper":

The visible supply of copper is the pulse by which its condition and its prospects are tested. Recently it has indicated great feverishness and irregularity. In normal circumstances the best remedy would be to remove the cause of fever and relieve the apoplectic patient by bleeding him. That, however, is what the syndicate dare not do. At the doctor's instigation the patient has overreached himself, and it is the doctor's interest that he should continue overreaching himself. The disease itself cannot be removed without ruin to the doctor, but the symptoms may be modified. The patient's temperature may be cooled artificially—in other words, the increasing glut of copper may somehow be made to look smaller than it is.

We have had frequent occasion to point out that the so-called "visible supply of copper" is only a comparative term. It embraces only the stocks at certain recognized points. No doubt these are the most important storage points, and, when the market is left to itself, they may cover practically all the floating supply available for international commerce. But if, for any conceivable reason, it were desired to create a diversion, or to tone down inconvenient statistics, nothing could be easier than to do so. At this moment nearly, if not quite, three-fourths of the copper production of the world is under contract to M. Secrétan and his associates. As soon as it comes into existence they are its owners; they can say what is to be done with it, and where it is to be kept. If M. Secrétan were to ask the Rio Tinto or the Tharsis Company to let a few thousand tons accumulate at their works, they would, of course, do so. If he were to make a similar suggestion to one or another of the American companies they would be equally obliging. The Panulcillo and other Chilean companies, with which he is on intimate terms, would make no objection to store their copper for him, so long as he paid for it in terms of his contract.

All the metal thus held back is kept out of reach of inconvenient statistics. So long as it is so held it will never enter the visible supply, and to that extent the visible supply will be underestimated. In a dozen other different ways stocks on hand may be rendered unobtrusive. Copper is not a bulky article, nor does it require luxurious accommodation. It needs no shelter from the weather, and may be stacked in the open air if nothing better offers. For aught that is known the *Société des Métaux* may be forming large accumulations of its own works at Rouen. Large quantities of Chili bars have been transferred lately from Liverpool to Havre, and the stocks at Havre

have been greatly increased in consequence, though not so much as they might have been expected to do. Formerly 700 or 800 tons was the average stock of Chili bars kept at Havre and Bordeaux, but at these two ports there are now nearly 5000 tons. Simultaneously the stock of other copper has jumped up from under 1000 tons to 4600 tons. Rouen, though it has never been included in the visible supply, is in fact a much more important storage point than Havre itself. In M. Secrétan's works alone there have frequently been 10,000 tons of copper in stock. There may be that amount now, or there may be even twice as much. When M. Secrétan gets advances from the Bank of France or the Comptoir d'Escompte an arrangement may, without much difficulty, be made for taking a lien on the copper at Rouen or any other point most convenient for him. That would be another side channel into which visible supply might be diverted, and the monthly returns rendered so much the less alarming.

Bad as the statistical position is, we have no safeguard or guarantee whatever against its being even worse than it looks. The visible supply is, as we have shown, a very elastic item, which may be artificially contracted or expanded at the will of powerful manipulators. It represents only the stocks at a dozen or more selected points, and there may easily be 30,000 or 40,000 tons more copper at other points, as to which no reliable information can be obtained. It takes no cognizance whatever of second-hand copper, which is known to have accumulated to the extent of thousands of tons in the hands of smelters and manufacturers. It ignores the stocks held in India on speculation, much of it by the syndicate itself. These were bought up in the early stages of the boom, and are now held at an average of £70 per ton. They are part of the cause of the depression among the Birmingham manufacturers, and they may be the means of prolonging it even after the inevitable fall in the value of copper has taken place. When the demand in India arrives, these accumulations of £70 copper will have to be worked off before there can be an outlet for new shipments. In the same way the stocks of old copper which have been collected by English manufacturers will have to be got rid of before any strong demand can arise for new copper.

If such outside stocks in private hands were added to the official statistics the "visible supply of copper" at this moment would be very much more formidable than the 69,000 tons now weighing so heavily on the market. A direct and practical proof of their magnitude is to be found in the fact that buyers of copper rarely have to go to the syndicate for it. There are smelters and merchants outside of the syndicate who can supply all that is wanted for the daily requirements of business at £5 or £6 per ton under the syndicate price. So limited are the current necessities of the manufacturers that hardly a transaction occurs which would not have been considered a mere bagatelle 12 months ago. The consumption of copper is even smaller than the attenuated deliveries indicate, and the actual accumulations of stock are very much larger than appears in the "visible supply."

Among the other articles making up the series are the following: "What the Ring Has Undertaken," "Birmingham and the Copper Ring," "The Copper Corner in America," "Bolstering the Share Market," "The Copper Companies' Dividends in 1887," and "Hard Facts for the Syndicate."

On the whole, Mr. Lawson takes an extremely bearish view of the situation of the metal, although he recognizes the fact that Secrétan and his followers have the power, and may exercise it, of calling for a reduction in the output of the mines controlled by him, and he suggests that as a last resort the syndicate may be able to induce the companies to lower their contract prices in order to enable it to let the market down easily. Though the corner seems doomed, there are various ways in which it may break up. It may do so violently or gradually, suddenly or cautiously. Eighty pounds per ton copper is an anachronism as difficult to bring back to life as Queen Anne would be.

The new constitution of the Amalgamated Association adopted at the convention of that organization, held in Pittsburgh last month, contains a number of changes, the most important being a clause making a number of other workmen eligible to membership. The new classes of

workmen that are now eligible are: Metal and other stockers, bar bankmen, cinder wheelers, carpenter-millwrights, hollow firemen, shearmen and other crews, tap welders, butt-welders, turners-down, pit-hands, takers off, bar pullers, skelp benders, roll setters, socket-makers and ball grinders working in wrought-iron pipe mills, blacksmiths, machinists, millwrights, greasers, firemen, water-tenders and all hands employed in nail, tack and spike factories, wrought-iron pipe mills, galvanizing works, bolt, nut, washer and other factories and shops run in connection with iron and steel mills, except furnace builders, bricklayers and common laborers.

The Strike at Singer, Nimick & Co.'s Works.—As we predicted in our issue of last week, the strike at the steel works of Singer, Nimick & Co., Limited, at Pittsburgh, has been settled, the firm having gained a complete victory over the Knights of Labor. Every department of the works is now in full operation, and applications are being received every day from old employees who wish to be taken back into the employ of the firm. As we have already stated, the trouble was not one of wages, but was caused by the firm coming to the conclusion to operate their mills in the future independent of the Knights of Labor or any other labor organization. In this they have been wholly successful, and from this time forward their employees will be all non-union men. The effect of this victory is being strongly felt by the Knights of Labor, and a very large number of members have receded from the ranks of that organization, and it is the general belief that in a short time its power among the manufacturing establishments at Pittsburgh will be wholly departed.

Mr. David H. Thomas, superintendent of the Thomas Iron Company, reports to us that in one week No. 3 Thomas furnace, at Hokendauqua, made 511 tons of iron, using three-eighths Lake Superior, three-eighths New Jersey magnetite and two-eighths native hematite, producing 511 tons of iron, of which 171½ tons were No. 1 X, 115 tons were No. 2 and 224½ were plain 2, the quantity of ore charged being 895 tons, and limestone, 290 tons. The fuel consumption was 576 tons, 144 tons being coke. This includes an allowance of 6 per cent. for waste, so that as usually reported the fuel consumption would be somewhat less. We may add that the company are building one set of Durham pipe stoves for No. 1 furnace.

The example of the town of Waldoboro, down in Maine, says the Boston Herald, in erecting and fully equipping a building for the manufacture of shoes, at the expense of \$20,000 for the sole use of a Massachusetts firm which had offered to locate its eastern business there on the fulfillment of these conditions, is rather generous, to say the least. Numerous towns and cities have offered to exempt the property of new business firms from taxation for a time, on condition of their establishing themselves within their limits, but building and fitting out a factory is offering a rather tempting inducement to business concerns. If this sort of thing keeps on, there is nothing which a town may not do in order to bring business to it.

On the 31st ult., the boiler room and bridge house of the Muirkirk Furnace, at Muirkirk, Prince George's County, Md., was burned down, and the furnace chilled. The machinery for crushing ores and other parts of the plant are ruined. Mr. Charles E. Coffin informs us that, while he is insured, the sum will probably not cover half the loss. The destroyed portions of

the plant are to be rebuilt, but as yet it is not known when the furnace will go into blast. Mr. Coffin contemplates putting up an iron stock house and elevator if it can be done cheaply.

Cast-Steel Guns.—A press telegram from Washington, D. C., to Pittsburgh, under date of the 26th ult., gives the following information in regard to the cast-steel gun recently built by the Pittsburgh Steel Casting Company, of Pittsburgh, and which has been sent to Washington for the purpose of being tested. The Pittsburgh cast-steel gun has been moved to the shell-room of the ordnance foundry at the navy yards, and workmen began to-day to remove the unevenness that remains after rifling and cutting the place for the breech. This process of "lapping" out will require some time, but still more time will be required to construct the mechanism of the breech, as all departments are overwhelmed with work. The band for elevating and depressing the gun has also to be put in place. It is thought that the gun will be ready for the test within 30 days. Without special announcement another cast-steel gun, with a bore similar in size to that of the Pittsburgh gun, has recently made its appearance at the Navy Yard. It is from the works of the Standard Company at Thurlow, near Chester, Pa. The Thurlow gun is not yet placed upon the lathe, but lies just as it was received from the foundry.

In his forthcoming report Col. Sydney Maxwell, Superintendent of the Cincinnati Chamber of Commerce, says that last year the receipts of manufactured iron in that city aggregated 155,885 tons, the largest in its history. He says that 108 acres of ground have been secured on the Ohio River, adjacent to Cincinnati, for the erection of the largest and most complete plant in the world for casting iron pipe.

A correspondent writes us: "T. J. Lattner is building a nail factory at Rome, Ga., and was in Pittsburgh last week purchasing machinery, &c., for his works. The nail machines he bought from the American Nail Machine Company, at Ashtabula, Ohio, at the low price of \$110 each. Four years ago these machines sold for \$300 each, with the demand greater than the supply. This condition of affairs can only be accounted for by ruinous competition, overproduction or tariff tinkering."

The National Pipe Bending Company, New Haven, Conn., have been very busy for the last month in the manufacture of their National feed-water heater and coils of iron, brass and copper pipe, for which they have special machinery. They are now making three coils containing 1000 feet each of 1½-inch iron pipe, which are to be shipped to Louisiana; this is the third order for that size coil.

Mayor Hewitt, on Tuesday, appointed four Aqueduct Commissioners—namely, Gen. James C. Duane, until recently chief of the Engineer Corps, United States Army; Francis M. Scott, of the County Democracy, and Assistant Corporation Council since 1885; ex-Assemblyman Walter Howe, Republican, who is a lawyer, and John F. Tucker, a well-known builder.

A bill in Congress proposes to retaliate any discrimination against American vessels passing through the Welland Canal by imposing a toll of 20 cents per ton on all foreign vessels passing through the Sault Ste. Marie Canal.

The blast furnace of the Thomas Furnace Company, of Niles, Ohio, was blown in to-day to manufacture Bessemer pig iron for the trade.

Foreign Markets.

EQUIVALENTS.

	Cents.
Franc, Peseta or Lira.....	19.3
Florin (Netherlands).....	30.2
Florin (Austria).....	35.4
Wirels (Portugal).....	51.08
Wirels (Brazil).....	54.8
Mark (Germany).....	23.8
	Pounds.
Kilogram.....	220.5
Picul.....	131.

BRAZIL.

PARA. July 24, 1888.—*India Rubber.*—Light receipts during the month have caused our market to stiffen, values, moreover, being favored by the considerable rise in Exchange. July 27.—Our market has advanced 50 reis per kg.; there remain unsold only 10 tons. The arrivals in July will fall off 200 tons from those of July, 1887. Exchange unaltered. *Silver.*—The Government have resolved to withdraw from circulation the 500 and 2000 reis Treasury notes, and replace them by Silver Coin. Some \$7,000,000 worth of Silver will consequently have to be purchased abroad by the Imperial Mint.—*Per cable direct.*

AUSTRALIA.

MELBOURNE. July 13, 1888.—*June Shipments* from Melbourne, Adelaide, Sydney and Queensland to England were composed of 8000 bales Wool, 1100 tons Tallow, 300 tons Copper, 100 tons Copper ore, 8700 cwt. Wheat, 900 tons Flour and 400 tons Tin.—*Per cable via London.*

EAST INDIES.

SINGAPORE. July 13, 1888.—*Tin.*—Our last report was dated 31st ult., since when there is no material change in the position. Buyers offer according to the prices ruling in London, but sellers refuse to part with their old stocks, and the arrivals from the mining districts have been very small. The last transaction was at \$33.50. *Tonnage.*—Steamer rates to London are steady for immediate shipment at 27/6 @ 30/ for weight. For New York via Canal no tonnage offers; via Cape, the Wilhelm Anton, clears to-day, leaving the berth to the Sesi-noora. Rates are unchanged. For Boston the berth is vacant. *Exchange* is quoted 3/1½ for six months' sight.—*Gillilan, Wood & Co.*

MANILA. July 23, 1888.—*Hemp.*—There are buyers at \$9.25 per picul, against \$8.12½ same time last year, equaling cost and freight per ton, £31. 5/, against £27. 13/4. Clearances for the United States since last cable there were none, against 2000 bales last year; ditto since January 1, 99,000, against 125,000; loading for the United States, none, against 11,000. Cleared for Great Britain since January 1, 193,000, against 115,000; loading for ditto, 23,000, against 21,000. Cleared for all other countries, 45,000 bales, against 23,000; receipts at all ports since last cable, 5000, against 7000; ditto since January 1, 328,000 bales, against 257,000 last year and 210,000 in 1886. *Freight*, \$6, against \$5 in 1887. *Exchange*, six months' sight, London, 3/5½, against 3/5½.—*Ker & Co. to Charles Nordhaus, New York, per cable direct.*

CALCUTTA. June 16, 1888.—*Jute.*—The tendency in the Jute market here has been a quieter one for the past ten days. Sales were made of September-November delivery at 27.8 rupees per bale, f.o.b. Balers do not press the sale of later futures. Advices from Narain-gunge are disquieting with reference to the new crop. There have been everywhere in the region either rains or a clouded sky, an unusual kind of weather during the dry season; as, at the same time, the monsoon suddenly set in, the plant cannot mature properly. Hence it is estimated that the yield in Narain-gunge will fall 25% short of last year's. There has been no abatement in the high temperature here of 103° in the shade. The sky is clouded; rain is looked for in a day or two.—*Times of India.*

SPAIN.

BILBAO. July 14, 1888.—*Iron Ore.*—For three months past there has not been the animation noticeable during the present week and fortnight, numerous single cargoes being taken at 6/10 @ 7/3 per ton, Rubios, and at 7/6 @ 8/ Campanil, total shipments to date summing up 2,064,570 tons, as compared with 2,430,300 in 1887. *Pig Iron.*—The export reached 2515 tons, and coastwise shipments 688 tons. The spot price here is 57 @ 60 pesetas, futures 55 @ 58, and Lingotillo, at Huelva and Seville, 65.—*Bilbao Marítimo y Comercial.*

SWITZERLAND.

ZURICH. July 18, 1888.—*Silver Coinage.*—The Federal Council declines to allow Italy, as member of the Latin Union, to recoin its old Bourbon dollars into five-franc pieces and fractional silver coin, as this would only be increasing the silver circulation with which Switzerland, since the late decline in the metal, is being flooded from Italy. Besides, at the last Latin Union conference both the Belgian and Swiss delegates emphatically declared that they

were opposed not only to all new coinage of Silver, but quite as much to recoinage a portion of the five-franc pieces at present in circulation.—*Neue Zürcher Zeitung.*

GERMANY.

HAMBURG. July 21, 1888.—*Iron.*—Pig Iron has continued quiet in Rhenish-Westphalia, the Transatlantic demand for Spiegel does not revive, but the domestic inquiry compensates for this; 10 to 12% is quoted 57 marks. Orders are booked three months ahead. Rolling mills have bought little or no Forge Pig, still being engaged in stock taking as they are, but this interruption will soon cease. Some temporize, because they first want to await the fate of the various syndicates, the continuation of some of which seems precarious. Good quality Forge Pig is worth 50 marks per ton in Rhenish-Westphalia, and 47 to 49 in the Siegen district. Thomas is in brisk demand and very firm; Luxembourg is quoted 38.70. Domestic orders for Merchant Iron will last for three months to come. Although there is still a lack of export demand, the price remains 125 to 127.50. Aggregate sales during second quarter have been considerably below those made during the first quarter. While boiler plates have remained as lively as before, thin sheets are neglected; the Wire Rod export demand does not revive; Machine shops, foundries and car works are all doing well. *Spelter.*—Advices from Silesia state that Spelter production in the province is at present decreasing, together with that of desilverized Lead. The output of Spelter during the first quarter was 20,900 tons as compared with 20,478 tons during the corresponding period in 1887, the deliveries being 19,727, against 16,805; the number of workmen employed was 6047, against 6269; the export from all Germany declined during the first four months from 15,934 tons of Spelter and Scrap Zinc to 14,911 this year, and of rolled from 5425 to 3483 tons. The Hamburg market for Spelter has remained firmly sustained. German Lead is rising and now commands 13.60 marks per 50 kg., while Copper is weaker.—*Borsenhalle.*

Strikes and Lockouts.

The "Report upon Strikes and Lockouts" compiled under the supervision of Hon. Carroll D. Wright, Commissioner of Labor, has just been issued from the Government Printing Office. It covers the period of six years, ending December 31, 1886, and is very thorough in its details of the subject. In fact, the ponderous volume of 1172 pages would be of little use except to specialists were it not for the excellent analysis of the tables which Mr. Wright has compacted into 25 pages. Great pains have been taken to insure the accuracy of the report, and it may be accepted as a complete and correct history of the matter undertaken, or at least as nearly so as could be possibly obtained.

OBTAINING THE DATA.

The methods under which this investigation has been conducted were as follows: The files of all the leading newspapers, trade journals and commercial periodicals published in the United States during the years involved in the investigation were searched for all references to strikes. The agents of the Bureau of Labor were thus supplied with primary evidence of the existence of strikes, the names of the parties interested and the establishments concerned. They were also instructed to make diligent inquiry in all directions for other strikes, especially from labor organizations and manufacturers' associations. The Commissioner of Labor believes that by these means the Bureau has secured information relating to nearly every strike, if not every strike, which has occurred in the United States during the six years ending December 31, 1886.

Four leading causes of strikes are: for increase of wages, for reduction of hours, against reduction of wages and for increase of wages and reduction of hours. These were the causes of the strikes in 77.16 per cent. of the establishments. Strikes were made in 800 establishments for reduction of hours and against being compelled to board with employer.

It is shown by the summaries that out of the whole number of establishments affected success followed the strikes in

10,375 establishments, or 46.52 per cent. of the whole; partial success was gained in 3004, or 13.47 per cent. of the whole, and failure followed in 8910 establishments, or 39.95 per cent. of the whole number, and strikes were still pending in 15 establishments on December 31, 1886.

For lockouts 564 establishments, or 25.47 per cent. of the whole, succeeded in gaining their point; 190, or 8.58 per cent., partially succeeded, and 1339, or 60.48 per cent., of the whole failed, while lockouts were still pending in 121 establishments, or 5.47 per cent., on December 31, 1886.

THE LOSSES ENTAILLED.

The loss to the strikers for the period involved was \$51,814,723. The loss to employees through lockouts was \$8,157,717, or a total wage loss to employees of \$59,972,440. These losses occurred in 24,518 establishments, being an average loss of \$2446 to each establishment and of over \$40 to each person involved. A table is given showing the number of days required for employees to recover wage losses in wholly successful strikes for increase of wages.

The extreme cases are a laborer's strike in New York, in which the average wages lost were 61 cents and the time to make up the loss was only one day, and a strike of binders and trimmers of fur hats at Danbury, Conn., in which the wages lost were \$19.24, and the increase gained was only 1 cent per day, so that it required 1924 days to make good the loss. The average wages lost per employee in all the successful strikes was \$20.42, the average gain in daily wages was 27 cents, and the average time to make up the loss was 76 days.

Mr. Wright thinks that the turning point was reached in 1886, and that it can be emphatically stated that strikes are now on the decline.

The chapter upon strikes and lockouts prior to 1881 contains much interesting information. The first strike of record was that of the journeymen bakers in New York city in 1741. They were tried for a conspiracy not to bake until their wages were raised, and convicted, but it does not appear that any sentence was ever passed.

SOME OLD-TIME STRIKES.

In 1796, 1798 and 1799 the journeymen shoemakers of Philadelphia struck for higher wages and were successful. In November, 1803, a strike occurred in New York City which is commonly known as the "Sailors' strike," and which has been generally considered as the first strike in the United States. A number of sailors struck for an increase of pay from \$10 to \$14 per month. They marched around the city and compelled other seamen to leave their work, but were put to flight by the constabulary, who arrested their leader and lodged him in jail. The strike was a failure.

A very singular strike occurred in 1817 in Medford, Mass. Thacher Magoun, a shipbuilder, notified his men that he would not furnish them with the customary grog, and that no liquor should be used in his shipyard. The men wrote the words "No Rum! No Rum!" upon each stick of timber in the yard, and some of them refused to work, but finally gave in.

This was paralleled by a general strike of employees upon the railroad between Reading and Hamburg, Pa., in 1839, where the demand was for an increase of pay from \$1 to \$1.12½ per day, and for more whiskey, the allowance being a pint and a half per day to each man, dealt out in nine doses.

The compilation of the statutes of the different States concerning strikes, combinations, conspiracies, intimidations, boycotts, &c., shows that Maryland, New Jersey and New York have enacted laws authorizing combinations of workmen to secure advances in wages.

TRADE REPORT.

Chicago.

Office of *The Iron Age*, 95 and 97 Washington St.,
CHICAGO, July 30, 1888.

Pig Iron.—The increased business which has been threatening for some time made its appearance last week. Buyers took hold very liberally in several lines, notably in Lake Superior Charcoal and Ohio Softeners, with also some regard for Southern Coke. The sales of Lake Superior Charcoal and Alabama Car-Wheel aggregated over 20,000 tons, distributed among Malleable Casting and Car-Wheel manufacturers and the Agricultural Implement trade. Several thousand tons of Southern Coke and Ohio Softeners were also disposed of. Although these sales constitute a regular feature of the trade at this time of the year, and therefore do not indicate in themselves a radical change in the market, yet a good feature of the situation is the fact that the buyers were not able to break prices to any extent. One or two contracts for Lake Superior Charcoal were placed at quite low figures, but most of the orders were based on \$19 and \$19.50, cash. The lowest sellers are now in a position to demand an equal price with the balance of the trade and insist that they will no longer make concessions. Lake Superior Coke was not in as strong demand as some other Irons; nevertheless a considerable number of small orders were booked. The makers of Coke Irons, both Northern and Southern, are now disinclined to take orders extending beyond this year, while most of them are endeavoring to shorten the time to three months. Cash quotations are as follows, f.o.b. Chicago: Lake Superior Charcoal, all numbers, \$19 @ \$19.50; Alabama Car-Wheel, \$26.25; Southern Charcoal Foundry, No. 1, \$18 @ \$19; Jackson County Softeners, No. 1, \$17.50 @ \$18; Hocking Valley, Soft Foundry, No. 1, \$16.50 @ \$17.50; American Scotch (Blackband) No. 1, \$18.25 @ \$19; other Ohio Scotch Irons, No. 1, \$17.50 @ \$18; Lake Superior Coke, No. 1, \$17 @ \$17.50; No. 2, \$16 @ \$16.50; No. 3, \$15 @ \$15.50; Southern Coke, No. 3, \$17; No. 2 and Open Bright, \$16.50; No. 3, \$16; No. 1 Mill, \$15.50.

Bar Iron.—The heavy inquiries from the Agricultural Implement trade alluded to in last week's report have not yet been placed, but will be very shortly. They will probably be 25 % in excess of the orders placed last year, owing to the prosperous condition of the farmers. Jobbers and small consumers are in the market for a considerable quantity of Iron, but the mills are slow about starting up and agents are somewhat at sea in making quotations for early deliveries. The usual rate for carload lots is 1.85¢, half extras, f.o.b. Chicago, for Common Iron, but some sellers ask more, while a few are willing to shade this quotation for satisfactory specifications and deliveries. The organization of Western Bar Iron manufacturers is expected to play an important part shortly in regulating production and preventing the cutting of prices. Store quotations range from 1.90¢ to 2¢, according to quantity and quality.

Structural Iron.—The demand has been quiet of late, except for small lots from store, which are freely called for. A contract for an Iron swing-bridge across the Calumet River was awarded to P. E. Lane & Co. for \$6392. Mill lots quoted as follows, f.o.b. Chicago: Angles, 2.20¢; Universal Plates, 2.25¢; Tees, 2.45¢; Beams, 3.40¢; Store prices are as follows: Angles, 2.40¢ @ 2.70¢; Tees, 2.60¢ @ 2.90¢; Beams and Channels, 3.80¢.

Plates, Tubes, &c.—A very large business has been transacted in Plates. Although the mills have advanced their rates on Tank and Heavy Sheet Iron and on large lots of Boiler Tubes, the local dealers have as yet made no change in their prices and still quote as follows: Heavy Sheets, Nos. 10 to 14, 2.65¢; Tank Iron, 2.55¢; Tank Steel, 2.80¢; Shell Iron, 3¢; Shell Steel, 3.25¢; Flange Iron and Steel, 4¢; Fire-Box Steel, 4.75¢ @ 5.75¢; Boiler Rivets, 4¢ @ 4.25¢; Ulster Iron, 3.75¢; Boiler Tubes, 60 % and 10 % off on 2½-inch and larger and 62½ % off on 2-inch and smaller.

Sheet Iron.—Brokers are now having much difficulty in finding mills ready to take orders for Black Sheets, as many have their capacity engaged, and others are not running. Those in a position to handle some of the business offered ask 2.95¢ @ 3¢, f.o.b. Chicago for No. 27. Jobbers quote 3.10¢ @ 3.20¢ from store for small lots of No. 27, and are having a good demand from the trade.

Galvanized Iron.—Manufacturers' agents report another heavy week. Cornice-makers, car builders and other classes of consumers have taken large quantities. They find prices more easily sustained. Small lots continue to be quoted at 60 % and 5 % off for Juniata, and 60 % and 10 % off for Charcoal.

Merchant Steel.—The heavy consumers are now soliciting bids for their year's supply, and it is reported that some of these orders have already been placed at prices approaching those prevailing two years since. Store trade has been excellent, the orders though small being numerous. Quotations range as follows: Bessemer Bars, 2.30¢ @ 2.50¢; Tool Steel, 8¼¢ @ 9¼¢; Specials, 13¢ @ 25¢; Crucible Spring, 4.40¢; Open-Hearth Spring, 2.90¢; Open-Hearth Machinery, 2.75¢ @ 3¢; Crucible Sheet Steel, 7¢ @ 11¢.

Steel Rails.—A few contracts are under negotiation, but no sales have been made for some time, and the local manufacturers are fast approaching the last of their orders. They are inclined to take some encouragement from the crop reports and from the recent decision of Judge Brewer in the Iowa railroad cases, both of which will have a favorable effect on railroad earnings and railroad securities, thus leading to purchases of Rails, but the benefits thus expected are remote. In the absence of business quotations are nominal.

Old Rails and Wheels.—Sales of Old Iron Rails are reported at \$19, \$19.50 and even \$20. A sale of 1000 tons at an interior point was made at \$19.50, and another lot brought \$18.50 on the Ohio River, equal to \$19.50 or \$19.75 here. The supply is now quite limited, while there are numerous inquiries from consumers willing to pay \$18.75 @ \$19, but who feel that \$19.50 @ \$20 is too high in proportion to the price of Bar Iron. Old Car-Wheels are a trifle higher and could now be sold at \$19, but they seem to be very scarce.

Scrap.—Wrought Scrap is lower, with very little moving. A moderate demand is experienced for cast. A limited sale has been found for Borings and Turnings, but they are only wanted at low prices. Steel is very quiet. Mixed Country Scrap is quoted at \$11 @ \$11.50. Selling quotations for carefully selected are as follows, per ton of 2000 lb.: No. 1 Forge or Railroad Shop, \$16.50 @ \$17; Track, \$16; No. 1 Mill, \$12 @ \$12.50; Light Wrought, \$8; Horseshoes, \$16.50; Axles, \$22; Cast Machinery, \$12 @ \$12.50; Stove Plate, \$9.50 @ \$10; Cast Borings, \$7.50 @ \$8; Wrought Turnings, \$10; Axle Turnings, \$11.50 @ \$12; Coil Steel, \$13; Leaf Steel, \$14; Locomotive Tires, \$14.

Hardware.—A very good trade is reported from jobbers in Shelf Hardware. The demand is now running largely to fall goods, such as Sheet Iron, Nails, Tin Plate, Tinnery's stock of all kinds, Stove Boards, Coal Hods, Stove Furniture, &c. Prices are being steadily maintained, and in nearly every respect the condition of this branch of trade is highly satisfactory. Jobbers in Heavy Hardware are feeling a little improvement in their trade also, particularly in the demand for Wagon Material.

Nails.—Although manufacturers' agents report actual business as very slight in volume, they are in constant receipt of a stream of inquiries, indicating the anxiety with which the course of the market is now being watched. Any indication of prices hardening would doubtless cause a rush of orders. Large lots of Steel Nails from factory are still quoted at \$1.90 @ \$1.92½, f.o.b., Chicago, for ordinary specifications, while small lots from store are held at \$2.05. Jobbers quote Wire Nails at \$2.50 @ \$2.60.

Barb Wire.—Trade is very dull, most of the factories being shut down for repairs, and the jobbers making no effort to force business. Small lots are still quoted at 3¢ for Painted, and 3.75¢ for Galvanized.

Pig Lead.—Manufacturing consumers have purchased quite freely, both spot and futures, taking in the aggregate over 600 tons, which was bought at 3.85¢ @ 3.90¢. The tone of the local market has been very firm and values have been well maintained, 3.90¢ being bid for Desilverized at the close of the week.

Copper.—The negotiations referred to last week are still continuing, buyers hoping to get lower figures and sellers resisting.

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St.,
PHILADELPHIA, Pa., July 31, 1888.

Pig Iron.—The market has maintained a firm tone, and, although there are no changes in quoted rates, holders appear to be gaining confidence, so that, as compared with last week, the position is probably a shade better. In any case the disposition is to ask full prices, while requests for concessions are not entertained for a moment. Still there are no indications of any important changes, as there is plenty of Iron for sale yet, although not precisely such brands as consumers would prefer. But on any slight advance it is believed that the supply would soon be increased, so that consumers are in no hurry to place orders at advanced prices. The position is carefully watched, however, the feeling of confidence being so general that people are inclined to look only on one side of the market, and that for the present is the bright side. But, as already stated, while consumers are willing to buy liberally, and have bought liberally at the old prices, they are not ready to pay an advance, unless for small lots, or under special circumstances. The sellers' standpoint is about as follows: Those who make really good Iron have already sold as much for forward delivery as they care to sell, and are asking a small advance on new orders. Those who occupy a less favorable position in the trade are still quoting the old prices for prompt deliveries, but are not generally willing to accept orders for delivery later than October. This statement fairly covers the entire field, so that further comment seems to be unnecessary. Sales during the week taking the extreme limits at both ends have been as follows for tidewater deliveries: No. 1 Foundry, \$18 @ \$19; No. 2 do., \$16.75 @ \$17.50; Gray Forge, \$15.75 @ \$16.25. Southern Irons might possibly be had for

less money, but there is no demand, and no offerings at prices likely to prove acceptable to buyers.

Foreign Iron.—Prices are entirely nominal, as there is no demand, and no inquiries likely to lead to business at present. Asking prices are as follows: Bessemer, \$19 @ \$20, c.i.f., duty paid, and 20 % Spiegel, \$26 @ \$26.50.

Blooms.—Steel moves fairly in small lots. Prices about as follows: Slabs and Billets from \$29 to \$35, f.o.b. cars at mill, according to analysis; Charcoal Blooms, \$52 @ \$54; Run-out Anthracite \$42 @ \$44; Scrap Blooms, \$34 @ \$35 per "bloom" ton of 2464 lb. Foreign at tide, c.i.f., duty paid, \$29 @ \$30 for Nail Slabs; \$31.50 @ \$32.50 for 4 x 4 Billets, and \$35 @ \$39 for Siemens-Martin, price according to analysis, &c.

Muck Bars.—The demand is improving, and sellers find the market still in their favor. Sales during the week have been made at \$27 @ \$27.50, delivered, with a general disposition to stand out for \$27.50 @ \$28, delivered.

Bar Iron.—There is very little doing in Bars, and such demand as there is is met at very irregular prices. Some quote 1.85¢, firm, while others claiming to make strictly refined Iron are willing to shade 1.8¢, and still others go considerably below that figure; all depends on what a buyer is willing to accept as first quality. Skelp Iron is in better demand, however, and sales of about 2000 tons of Grooved are reported at somewhat higher figures than quoted a week ago. Sellers ask 1.82½¢ @ 1.85¢, delivered, but it is reasonably certain that the sales in question were at lower figures than these. But there is no doubt that manufacturers feel more confident of their position, and for the present, at least, will stand out for better prices.

Plate and Tank Iron.—There is nothing materially different from last week. Business in small lots is fairly active, but there are no large orders on the market, and mills do very little more than hold their own. Still the tendency toward improvement in other branches imparts a more hopeful feeling, and manufacturers believe that their turn will come soon. Meanwhile prices remain as before, say: Ordinary Plate and Tank Iron, 1.95¢ @ 2.05¢; Shell, 2.4¢ @ 2.5¢; Flange, 3.5¢; Fire-Box, 4¢; Steel Plates, Tank and Ship Plate, 2.3¢ @ 2.4¢; Shell, 2.7¢; Flange, 3¢ @ 3½¢; Fire-Box, 3½¢ @ 4½¢.

Structural Iron.—There is no great activity in this department, but there is a fair business nevertheless. Most of the mills have portions of unfilled contracts to work on, and this with a very good current demand keeps them pretty well employed. There is nothing in the near future likely to cause any particular change, although there are the usual hints of good things to come, but the dates not fixed. Prices same as before—viz.: 2¢ @ 2.10¢ for Bridge Plate; 2¢ @ 2.10¢ for Angles; 2.6¢ @ 2.7¢ for Tees, and 3.3¢ for Beams and Channels, Iron or Steel.

Sheet Iron.—The demand for good Sheets is said to be satisfactory, and the entire current output is taken at fair prices. There is the usual pressure to sell inferior qualities at comparatively low prices, but the demand is for the best makes, for which quotations are as follows for small lots:

Best Refined, Nos. 26, 27 and 28... 3¼ @ 3½¢
Best Refined, Nos. 18 to 25... 3 @ 3¼¢
Common, ½¢ less than the above.
Best Bloom Sheets, Nos. 26 to 28... 4½ @ 4¾¢
Best Bloom Sheets, Nos. 22 to 25... 4 @ 4¼¢
Best Bloom Sheets, Nos. 16 to 21... 3½ @ 3¾¢
Blue Annealed... 2.8 @ 3¢
Best Bloom, Galvanized, discount... 62½¢
Common, discount... 67½¢

Steel Rails.—There is very little business doing in this market, owing probably to lower quotations at mills further West. Small lots are quoted at \$30 @ \$30.50 at mill, but on firm offers for good-sized lots prices would doubtless be shaded to good buyers, but in the absence of such demand quotations are held as above, \$30 @ \$30.50 at mill.

Old Rails.—No sales have been reported in this market for some time past, but lots for delivery at mills near by have been sold at about \$22. Lots in store or afloat for this port are offered at \$22 @ \$22.50, but at present there are no bids at over \$21 Philadelphia.

Scrap Iron.—Market dull, and prices irregular. Small lots of good quality command about the figures quoted below, but the market will not bear much pressure: Asking prices, \$18 @ \$19 for cargo lots; \$20 @ \$21 for carload lots, delivered, or for choice \$21.50 @ \$22; No. 2 do., \$14 @ \$15; Turnings, \$13 @ \$14; Old Steel Rails, \$19 @ \$20; Cast Scrap, \$14 @ \$15; do. Borings, \$9 @ \$10; Old Fish Plates, \$24 @ \$25. Old Car-Wheels, \$17 @ \$18, Philadelphia, or its equivalent.

Wrought-Iron Pipe.—The improving condition of trade in this department noted last week continues, and manufacturers are meeting with a fair demand. Discounts are quoted as follows: Black Butt-Welded 55 ¢; on Galvanized do., 45 ¢; on Black Lap-Welded, 65 ¢; on Galvanized do., 52½ ¢; on Boiler Tubes 60 ¢.

Nails.—There is no change from last week, although in sympathy with the firmer feeling in other departments manufacturers are inclined to stiffen up a little. Lots from store are nominally about \$2.05, with the usual discount on large lots.

Chattanooga.

Office of *The Iron Age*, Carter and 9th Sts.,
CHATTANOOGA, July 30, 1888.

Pig Iron.—All developments during the past week show a decided stiffening up in prices, a much better demand and a general tone of encouragement throughout all the Iron districts of the South. Sales for round lots are being made without much correspondence, and in many instances at 25¢ to 50¢ in advance of the market, as it was a few days ago, and the general opinion appears to prevail that prices will go up at least \$1 before the summer closes. There have been sales of about 7000 tons to remain in the yard, for some of which spot cash has been paid. This appears to be very good evidence that parties who have some surplus in money have confidence that Iron will advance. The quoting prices at which the bulk of sales were made during the past week was \$14 for No. 2, and \$15 for No. 1; at the same time many were made at prices both above and below these figures, therefore, the market could not be quoted as steady.

Miscellaneous.—As the summer advances so also does the prospect of very abundant crops of all kinds develop. The subject of watermelons may not be very proper in this place, yet a few statistics may not be uninteresting. Information obtained from some of the shipping agents shows that so far the E. T., Va. and Ga. line have shipped 850 carloads; the Central System of Georgia, about 2000 carloads; the S. F. and W., about 2700 carloads; the S. C. and Port Royal, about 350 carloads, and from Augusta proper, about 50 carloads, making about 5950 carloads of melons so far this season. To this may be added about half as many more from Western Alabama, Louisiana and Mississippi, making nearly 9000 carloads. These net the grower from \$75 to \$150 per car, or nearly \$1,000,000. The

freight on these melons averages the lines from \$18 to \$35 per carload, or say \$225,000. The special agents who are detailed to look after these shipments state that the acreage will be doubled the coming year.

Cincinnati.

CINCINNATI, July 30, 1888.

Pig Iron.—There has been further improvement in the temper of the local Pig Iron market during the past week. There has been an active inquiry for both Mill and Foundry grades, and while the supply of Foundry has been ample there has been a scarcity of Mill Iron for prompt delivery. The volume of business has been materially increased since the rise commenced, but there is considerable irregularity in quotations. Ohio Irons may be obtained on a lower basis, relatively, than Southern grades, except Silvery and Softeners, but while there are several weak furnaces, the majority are demanding higher prices. Some large contracts have been placed during the week by agricultural works, car-wheel manufacturers and rolling mills, with other contracts in progress. While sales have been more largely of Foundry Irons the reason has been because of the scarcity of Mill Iron for immediate delivery. Silver Gray Iron is reported to be especially abundant, but this condition will probably be but temporary. The sales of both Mill and Foundry grades have been made for delivery during the next six months, and among the sales may be noted 3000 tons No. 1 Southern Coke Foundry at about \$16 @ \$16.50 for long delivery, 2000 tons No. 2 Southern Coke Foundry Iron at \$15.50, and several carload lots at \$15.75, cash, here; 1000 tons No. 1 Southern Mill Iron at about \$14 @ \$14.25, and moderate amounts of No. 2 Mill Iron at \$13.50 @ \$13.75; 2000 tons of Southern Car-Wheel Iron, Hanging Rock, equivalent to \$25, cash, here, and 5000 tons of Lake Superior Charcoal Iron at about \$20 @ \$20.25, cash, Cincinnati. Several 100-ton lots of Mottled Iron have sold at about \$12.75, cash, here. Beyond the confidence and increased volume of business there are no new features. Prices current here, cash, f.o.b., are approximately as follows:

Hot-Blast Foundry.

Southern Coke, No. 1.....	\$16.50 @ \$17.00
Southern Coke, No. 2.....	15.50 @ 16.00
Southern Coke, No. 3.....	14.50 @ 15.00
Ohio Soft Stone Coal, No. 1.....	17.00 @ 17.50
Ohio Soft Stone Coal, No. 2.....	15.50 @ 16.00
Mahoning and Shenango Valley.....	16.50 @ 17.00
Hanging Rock Charcoal, No. 1.....	20.50 @ 22.50
Hanging Rock Charcoal, No. 2.....	19.00 @ 21.00
Tennessee and Alabama Charcoal, No. 1.....	17.50 @ 18.00
Tennessee and Alabama Charcoal, No. 2.....	16.50 @ 17.50

Forge.

Strong Neutral Coke.....	13.50 @ 14.00
Mottled Neutral Coke.....	12.50 @ 13.00
No. 1. Mill Coke.....	14.00 @ 14.50
No. 2. Mill Coke.....	13.50 @

Car-Wheel and Malleable Irons.

Southern Car-Wheel.....	20.00 @ 23.00
Hanging Rock, Cold Blast.....	22.00 @ 25.00
Lake Superior Car-Wheel and Malleable.....	20.00 @ 21.00

Manufactured Iron.—Harmony having been restored among the mills and their workers, there has been more activity on the part of all concerned. Mills have bought more freely and have taken contracts for next year's delivery at about the basis of quotations previously named: Bar and Sheet Iron—Common Bar Iron, 1.90¢ @ 2¢; Charcoal Bar Iron, 2.90¢ @ 3¢; Sheet Iron, Boiled, Nos. 10 to 27, 2.50¢ @ 3.25¢; Sheet Iron, Charcoal, Nos. 15 to 25, 3½¢ @ 4½¢ lb.

Nails.—There has been a liberal supply of all kinds and only a moderate jobbing trade without change in quotations. Sales of round lots are made from the mills on the basis of 15¢ lower than quotations. Jobbing prices are based upon 12d @ 40d,

which sell at \$2 3/4 keg, with 10¢ rebate in carload lots at mills; 50d @ 60d, 25¢; 10d, 10¢; 8d @ 9d, 25¢; 6d @ 7d, 40¢; 4d @ 5d, 60¢; 3d, \$1, and 2d \$1.50 per keg more. Steel Nails sell at \$2 and Steel Wire Nails at \$2.65 @ \$2.75 3/4 keg.

Old Material.—There has been a more active demand for Old Rails, and some sales of moment have been reported at about \$19.50, cash, here. There has also been an improved demand for Old Wheels, but they have been more freely offered at \$18.50, cash, Cincinnati.

Louisville.

LOUISVILLE, KY., July 30, 1888.

Pig Iron.—The condition of the market during the past week has been about the same as last. Offers have been made quite freely for large amounts of Iron, but furnaces are rather slow in accepting same at present prices. As yet there has been no advance in prices since last week, but from the present outlook we think buyers may expect a slight advance at any moment. We think it advisable for those needing Iron for the balance of the year to buy at prices now prevailing, as, from the present view of the market, there appears to be no prospect of a decline, and indications point strongly to an advance. Placing ourselves in the position of those needing Iron, we would most assuredly take advantage of the present market. Several large Southern furnaces have suspended operations for the present and are unable to state when they will resume. We quote for cash as follows:

Southern Coke, No. 1 Foundry	\$18.00 @	\$17.00
" No. 2	15.00 @	16.00
" No. 2 1/2	14.50 @	15.00
Hanging Rock Coke, No. 1 Foundry	16.50 @	17.00
" Foundry	20.50 @	22.25
Southern Charcoal, No. 1 Foundry	17.25 @	17.75
Silver Gray, different grades	13.25 @	14.25
Southern Coke, No. 1 Mill, Neutral	12.75 @	13.75
" No. 2	12.25 @	13.25
" No. 1 " Cold Short	12.25 @	13.25
Charcoal, No. 1 Mill	13.25 @	14.75
White and Mottled, different grades	12.00 @	12.50
Southern Car-Wheel, standard brands	21.50 @	24.50
Southern Car-Wheel, other brands	18.50 @	20.50
Hanging Rock, Cold Blast	22.50 @	24.50
Hanging Rock, Warm Blast	18.50 @	19.50

Cleveland.

CLEVELAND, July 30, 1888.

Iron Ore.—Prices are a little firmer. The very high grade Ores, which sold two weeks ago for \$5.50 @ \$5.75, are now held at the latter figure although, as a matter of fact, but little of this quality remains unsold. The advance in Lake freights and the scarcity of many of the Bessemer Ores accounts for the stiffening up of the market. Sales of Hematite Ores, just below the Bessemer limit are reported to-day at \$4.60. Sales of non-Bessemer Menominees for Eastern delivery, at figures equivalent to \$3.80, f.o.b. vessels Cleveland, are also made public. It is becoming quite evident that mining companies will have demands for more Ore than they are now prepared to produce. Increased facilities at the mines are being discussed. Gogebic Bessemer are so well sold up that a local dealer is said to have been unable to fill a 25,000-ton order last week, although \$4.80 was offered. Ores from some of the mines in this district have been sold during the past seven days for \$4.70 @ \$4.75. The total shipments to date from the upper Lake ports aggregate 1,650,000 tons, as against 1,825,000 tons shipped up to a corresponding period last year. The Gogebic range has exceeded its shipments of last season by about 375,000 tons. The Norrie and Colby mines will together ship about 500,000 tons; the Ashland and Aurora combined about 250,000 tons, while the other mines in this district are calculated to bring the season's

output up to about 1,225,000 tons. The other ranges will fall below last season's record, the estimated output now being: Gogebic district 1,225,000 tons; Marquette district, 1,400,000 tons; Menominee district, 1,000,000 tons; Vermillion district, 450,000 tons.

Pig Iron.—Prices, although no higher than one week ago, are firmer, and consumers are buying more liberally. The demand at present so far exceeds the production that stocks are clearing up, and better quotations are looked forward to with every degree of confidence.

Manufactured Iron.—Bar Iron is selling at 1.65¢ @ 1.70¢. There is an active inquiry for sheets at 2.70¢ for No. 24 and 3¢ for No. 27. The mills are crowded with orders from bridge builders for special shapes.

Scrap Iron.—Miscellaneous and Wrought Scrap is very dull, extra heavy Axles, however, being in fair demand. Two or three small lots of Old American Rails have sold during the week at \$20.25.

Coke.—The demand is still heavy, with price at the ovens \$1 3/4 ton.

Pittsburgh.

Office of The Iron Age, 77 Fourth Ave.,
PITTSBURGH, July 31, 1888.

The Iron lockout is a thing of the past, but the mills have not all been started up yet, nor have all mill firms signed the scale, but they will be obliged to do so before resuming business. So far as the volume of business is concerned it is increasing, but there is no improvement in prices, and herein is where the great trouble lies. There never was a larger business in raw Iron than there has been during the past two weeks in this district; included in the sales reported were several large blocks. As a rule the improvement in the products succeeds that in the raw article, and consumers generally have been, to some extent, anticipating future wants. The feeling is gaining ground that there will be a large business this fall, but whether it will be sufficiently so to enable mill owners to realize better prices remains to be seen. The reports both from the West and South are very generally favorable, and these reports are not without their effect, as our Pittsburgh manufacturers are largely dependent upon those sections for a market for their products. While the Amalgamated Association managers feel considerably elated over their recent victory, and, not without reason, yet they, as well as the Knights of Labor, have also suffered a number of defeats; the latest one of the latter is the Steel works of Singer, Nimick & Co., which is now a non-union mill; while paying the same wages allowed by other mills, the proprietors refuse to recognize any labor associations; they treat directly with their men. A number of other concerns are running non-union, including the Black Diamond Steel Works, Park, Bro. & Co., Solar Iron Works, Wm. Clarkson, McKeesport Iron Works, W. D. Wood & Co., Edgar Thomson Steel Rail Works, Carnegie, Phipps & Co. and the Natrona Salt Works, each employing a large number of men. It is probable that other manufacturers will do likewise, as soon as they see their way clear. It is not so much the matter of wages as a desire on the part of employers to be free to treat with their employees directly and personally; they want to exercise the right to hire and discharge without dictation from committees of labor associations, and this is one of the strongest reasons for employers breaking loose from these labor organizations.

Pig Iron.—There is no abatement apparently in the demand; sales continue large. Sales of some 30,000 tons have

been reported during the past couple of weeks; however, this was not altogether unexpected, as it was not known that all the mills when they closed down July 1 had little or no stock, and they had to replenish before starting up. While the market is firmer, prices have undergone no change as compared with those of a week ago; some furnacemen are refusing to accept lower rates, but consumers have no trouble in obtaining about all they want. A considerable proportion of the Iron sold during the past couple of weeks was taken by speculators, and will be held at furnaces until there is a market that it can be disposed of at a profit. This is bad for the furnacemen, as this Iron held on speculation is liable to be thrown upon the market at any time. In regard to the stock of Pig Iron in this district in first hands it is not large, and while, as already noted, the market is firmer there is no indication of any immediate boom, as there is a possibility that prices may advance somewhat within the next 30 or 60 days. We quote as follows:

Neutral Gray Forge	\$14.00 @	\$14.35, cash
All Ore Mill	15.00 @	15.50, "
White and Mottled	13.50 @	14.00, "
No. 1 Foundry	16.50 @	16.75, "
No. 2 Foundry	15.75 @	16.00, "
No. 3 Foundry	14.75 @	15.00, "
Charcoal Foundry	21.50 @	24.00, "
Cold Blast Charcoal	25.00 @	28.00, "
Bessemer Iron	17.00 @	17.25, "

Of the 3000 tons of Bessemer reported, 2500 tons were at \$17 cash, and 500 tons at \$17.25 cash—the former may be regarded as the ruling quotation.

Manufactured Iron.—The demand is more active, but with an increasing production prices are no better, and here is the great source of complaint; it is the unremunerative prices that annoy mill owners more than anything else. Some, for this reason, are indifferent about taking new business, and they are making no special effort with this end in view, and the chief object in starting up is to hold their trade, prevent their customers from buying from competitors, realizing as they do that once gone it may not be easy to get them back. We quote prices as a week ago, although it is probable that for very desirable orders Bar quotations are being shaded: 1.70¢ @ 1.80¢ for Bars; Plate Iron, 2.10¢ @ 2.20¢; No. 24 Sheet, 2.70¢ @ 2.80¢, all 60 days, 2 % off.

Muck Bar.—There is more doing, but no improvement in prices, which are regarded by makers as very unsatisfactory, \$26 @ \$26.50, cash. Sale of 1500 tons reported at the outside quotation. Even at the outside price it is claimed that there is little or no margin.

Nails.—There is no improvement to note in this market. Pittsburgh manufacturers are still refusing to sell below the card rate, \$1.90, 60 days, 2 % off for cash, in carlots, but as they are getting no orders it is evident that competitors at other points are selling for less. It is claimed that purchases can be made at \$1.90, delivered at Chicago, equal to about \$1.77 in Pittsburgh. Our manufacturers claim that even at full card rate the margin is small, and that rather than cut below they will not run their factories, and there are but very few Nail machines running here at present.

Wrought-Iron Pipe.—There is but little change to note in the general position of the market, with the exception that Boiler Tubes are firmer and higher; there are comparatively few mills that make Tubes, and this accounts for their having stiffened up while the balance of the list shows no improvement. Discounts may be quoted as follows: on Black Butt-Welded Pipe, 60 %; do., Galvanized, 55 %; Black Lap-Welded, 70 %; Galvanized do., 60 % off; Boiler Tubes, 65 % off; Casing, 35 % 3/4 foot, net; 2-inch Tubing, 11 1/4¢.

Old Rails.—There is an increased demand, caused by the starting up of the valley mills, where the consumption is always large, and the market is firmer. We can report a number of small sales at \$20.50 @ \$21, cash, mostly at \$21, which may be regarded as the ruling price. It is rumored that a valley mill bought a lot of 4000 tons at \$20.50, but thus far the rumor has not been confirmed. There have been no foreign Rails sold here for a long time.

Billets, &c.—Bessemer Steel Billets are still quotable at \$28 @ \$28.50, cash, as to size, quality and delivery. Nail Slabs, \$28.75 @ \$28; Domestic Rail Crops, \$17.25 @ \$17.50. Sale 500 tons Foreign Crops at \$23.50. Those making a specialty of Billets are pretty well sold up, and some of them are indifferent about making additional sales, especially for future delivery.

Steel Rails.—Heavy Sections are still quoted at \$31 @ 31.50, cash, at works, but it is intimated that a desirable order could probably be placed below prices quoted. There have been but few sales reported here recently, but the Edgar Thomson is still running full, working on orders booked some time ago.

Merchant Steel.—No new points have been developed. Business fair. Prices unchanged. Best brands of Tool Steel, 8½¢; Crucible Spring Steel, 4½¢; Crucible Machinery, 5¢; Open-Hearth Steel, 2½¢. As stated elsewhere, the works of Singer, Nimick & Co. are now being operated by non-union men.

Railway Track Supplies.—Prices are weak, and Spikes are lower, being quoted at 2¢, 30 days, delivered: Splice Bars are still quoted at 1.80¢ @ 1.85¢, and Track Bolts at 2.85¢ with square and 2.95¢ with Hexagon Nuts.

Old Material.—There is a rather better demand, but no improvement in prices: No. 1 (railway shop), at \$19, net ton; do., Track Scrap about \$1 less; Car Axles, \$22.50 @ \$23; Cast Scrap, \$14.50 @ \$15, gross; Cast Borings, \$11.50 @ \$12.

Detroit.

WILLIAM F. JARVIS & Co., under date of July 30, report as follows: A most forgotten state of Pig Iron matters seems about to present itself—viz., short supply in makers' hands in certain grades and a decided stiffening on these grades in consequence. The clouds really look as if they were rolling slowly by already. Some buyers are worried to know where they are going to get Iron at old prices, and it is safe to judge they will be more worried before they find the lots they are vainly searching for. Southern Forge Iron, for reasonably prompt delivery, cannot be obtained at any price, while futures would bring from 50¢ to \$1 a ton higher than the lowest 1888 prices to-day. Foundry grades, both Northern and Southern, are more scarce. The buying in all directions has been very large, and this, coupled with the fact of an increased number of stacks out of blast, has caused the very healthy stiffening, which is growing daily. Lake Superior Charcoal Pig is becoming also harder to obtain—smaller stocks on hand and large purchasing—but has not yet assumed its usual position in the van of the advancers. We are pleased to be able to report a strong, healthy market, with quotations firm, as follows:

Lake Superior Charcoal, all numbers	\$20.00 @ \$20.50
Lake Superior Coke, all ore	19.25 @ 19.75
Lake Superior Coke, cinder mixed	18.00 @ 18.50
Standard Ohio Black Band	19.25 @ 19.75
Southern Gray Forge	15.75 @ 16.25
Southern No. 2	17.75 @ 18.25
Southern Silvery	17.00 @ 17.50
Jackson County (Ohio) Silvery	18.50 @ 19.00
Old Wheels	19.00 @ 19.75

New York.

Office of *The Iron Age*, 66 and 68 Duane street.
NEW YORK, August 1, 1888.

American Pig.—A number of the local furnace agents report that deliveries are growing heavier, though it does not appear that this is an exceptionally favorable sign, in view of the fact that July is always very light. Low prices continue to be named, and often prove a source of embarrassment, because facts coupled with the quality of the Iron are not always fully stated or appreciated. There is considerable diversity of opinion concerning Virginia and Southern Irons, agents generally insisting that they have little for sale, and that only at full prices, while reports from other sections indicate a continuance of low figures. Thus \$16.25 has been named on No. 2 Southern at Sing Sing, and \$17.25 on No. 1 in Brooklyn. Mahoning Valley Iron continues to be offered at low prices throughout this territory. We hear of Cinder Mixed Northern Iron being offered at \$16.50 for No. 1, tidewater, this being cold short metal, which can be used only for a few special purposes. Standard to choice Northern Irons command, tidewater delivery, \$18 @ \$18.50 for No. 1 Foundry; \$16.50 @ \$17.50 for No. 2 Foundry, and \$15 @ \$16 for Gray Forge.

Scotch Iron.—Some importers claim to observe a slight stiffening, due to an advancing tendency abroad. We continue to quote: Coltness, \$19.50 @ \$19.75; Summerlee, \$19.25 @ \$19.50; Langloan, \$19 @ \$19.50; and Dalmellington, \$18.25 @ \$18.75.

Bar Iron.—The pressure from the West appears to be relaxing slightly, Mahoning Valley mills quoting an advance of \$1 ½¢ ton, which puts down Refined from that section here at 1.75¢. We quote for car-load lots, half extras, on dock, 1.60¢ @ 1.65¢ for Common; 1.65¢ @ 1.7¢ for Medium, and 1.75¢ @ 1.8¢ for Refined, with special qualities selling as high as 2¢ @ 2.5¢.

Plates.—Some of the mills decline to name the same prices at which former sales have been made before having been given the opportunity of closely studying specifications submitted. We continue to quote: Tank, 1.9¢ @ 2¢; Shell, 2.15¢ @ 2.30¢; Steel Tank, 2.3¢ @ 2.5¢; Shell, 2.4¢ @ 2.5¢; Flange, 3¢ @ 3.50¢, and Fire-Box, 3.25¢ @ 4½¢.

Structural Iron.—A moderate amount of business is being done, and one of the near-by mills reports that the quantity of Iron turned out during June and July was heavier than any month in its history. Consumers, while buying only from hand to mouth, insist upon a very prompt delivery. A number of Bridge orders have been placed, among them one calling for a 500-ton lot of Iron. We continue to quote: Bridge Plates, 1.9¢ @ 2¢; Universal Mill Plates, 2¢; Angles, 2¢ @ 2.2¢; Tees, 2.5¢ @ 2.7¢, and Channels and Beams, 3.3¢, on dock.

Steel Rails.—Sales during the week aggregate between 10,000 and 12,000 tons in the East, a block having been taken by one mill in Eastern Pennsylvania, which is reported to be an eager seller, partly of stock on hand. The greater part of the Rails sold have been for the South, only one small lot having been taken for Eastern delivery. Prices are on the basis of \$30 at tidewater, equivalent to \$29 @ \$29.25 at Eastern mill, which is now an open quotation. There is some business pending, but, on the whole, the outlook is not considered encouraging, in view of the low prices reached in the West, where, according to good authorities, \$30 has been accepted at Chicago. We note a sale of 30,000 tons by a mill in the Chicago district to the Winona and Southwestern Road, all but 6000 tons for next year's delivery. The

meeting of the Rail Association takes place at the West End Hotel, Long Branch, tomorrow (Thursday).

Old Rails.—There is more inquiry, and, on the whole, a better feeling. We note a sale of 1000 tons of Tees, reported to have been at \$21 on cars, Jersey City. There is some inquiry for Foreign Double Heads, the small stock of which is, however, firmly held considerably above the market.

Fastenings.—The temporary stoppage of a number of the mills has led to an improvement, Spikes selling at \$2.05, delivered, New York, which represents a slight advance. Among the sales we may note one of 15,000 kegs by one mill to another. There are a number of small inquiries on the market. In Angle Bars a better tone has also prevailed, 1.90¢, delivered being asked. Among the sales we note one lot of 800 tons.

Spiegeleisen and Ferro.—The market is entirely nominal. We quote 80 % Ferromanganese, \$49 @ \$49.50.

Billets and Slabs.—No business is reported, except a small lot of foreign Slabs at \$29, ex-ship, bought for re-export.

Wire Rods.—Occasional sales are being made on the basis of \$39.75 @ \$40. Foreign quotations are 104½, Continental shipping ports. Consumers here claim that in view of the wretched condition of the Wire and allied trades they cannot pay present prices for Rods. The prospective heavy grain movement holds out the hope of lower freights for later months.

Financial.

The view is more decidedly confirmed within the last fortnight or so that our leading crops, such as cotton and the cereals, promise a liberal field. At the same time there are indications that the European markets will receive a large proportion of our surplus at remunerative prices. Already this belief is quickening activity in mercantile circles. The reports from the United Kingdom are of bad crop weather and higher prices all round. In the New York grain and provision markets this week toward the close business has been unusually extensive. On Monday fully 18,000,000 bushels of the options were taken at an advance ranging as high as 4¢, and changes in spot stock were no less radical, with many orders to buy. In corn there was strong reaction. Reports from the grain fields say that winter wheat is threshing out better than was expected. The yield of oats, it is thought, will be the largest ever known. In southern Minnesota the harvested winter wheat shows a yield of 30 bushels per acre. The Nashville *American* states that "the wheat yield in Tennessee has probably never been so large as it is the present season. The crop is so unexpectedly heavy that we have the novel spectacle presented of inadequate storage room, vacant rooms in dwellings in many localities being utilized for the purpose." A dispatch from Fort Worth, Tex., says a carefully prepared crop report, covering 150 counties in Texas, shows the quality of wheat, corn, oats and cotton to be good. Wheat has harvested 95 % of an average. Corn will make 34 bushels per acre, which is 105 % of an average. The cotton acreage is 98 %. A New Orleans merchant writes that cotton, sugar and rice all promise better crops than last year, and that a brilliant prospect for trade is opening in all sections of the South. Another says merchants are buying more than usual at this time of the year. The State Board of Agriculture of Iowa issued a crop report July 23, in which they place the condition of corn at 100 %; winter wheat, 95½; spring wheat, 86. Per contra, the State Board of Agriculture of Indiana report that the

wheat crop in the southern part of the State is a little less than an average. Corn averages 115 ¢, against 85 ¢ for the last four years. An Ottawa dispatch says Manitoba will have 15,000,000 bushels for export, 25 ¢ more than last year. Perhaps the most hopeful feature of the week was the decision of Judge Brewer that the acts of a State Railroad Commission might properly be inquired into by the courts and made to conform to reason and equity. The iron situation is better, and the tariff is less threatening. The cable war was finally settled on Monday, when the officials of the different companies signed the agreement raising the rate from 12½¢ to 25¢ a word, and making the press rate 10¢ a word instead of 6¢.

The Stock Exchange market on Thursday received an impetus from the announcement of Judge Brewer's decision sustaining the preliminary injunction against the Iowa Commission, which was construed as favorable to the grangers. The State Legislature cannot delegate powers to determine rates under his rulings. A better feeling abroad toward American securities was attributed to the same cause. The coalers were stronger during the week on account of reports of a better business in coal transportation.

United States bonds are quoted as follows:

U. S. 4½s, 1891, registered	107¾
U. S. 4½s, 1891, coupon	107¾
U. S. 4s, 1907, registered	127¾
U. S. 4s, 1907, coupon	127¾
U. S. currency 6s	120

The total bonds purchased by the Treasury Department under the circular of April 17th last are as follows: Amount purchased, 4 per cents, \$18,735,500; amount purchased, 4½s, \$8,942,300. Total, \$37,677,800. Cost, 4 per cents, \$23,794,600.58; cost 4½s, \$9,628,678.45. Total \$33,423,279.03.

It is reported that Gen. Roger A. Pryor has been appointed by Governor Hill special counsel for the civil prosecution of the trust corporations. The actions are to be commenced in the Supreme Court of this county, and involve a forfeiture of franchise. In Congress, the House Committee on Manufactures submitted their report concerning the trust investigation, to the effect that the usual form of combinations was devised for the purpose of placing monopolies beyond the reach of existing statutes.

The bank return for the week shows an increase of \$675,775 in surplus reserve, which now stands at \$27,116,175, comparing very favorably with its position one year ago, when the excess was about \$8,000,000. The loans were contracted \$141,900; the specie decreased \$362,200; the deposits other than United States decreased \$2,207,500. Time loans being no longer in favor with institutions generally, funds are being made available for contingencies in case there should be a heavy demand to aid in moving the crops, which is likely soon to occur. Already there is a perceptible hardening at Western points. At Chicago the rate of exchange is down to 25 cents discount, and at St. Louis is at 25 cents premium. It is assumed that the Treasury will readily reduce its surplus by the purchase of bonds or through the depositary banks should occasion arise. The large dry goods failure of last week is followed by that of J. & C. Johnston, on Broadway and Fifth avenue, who are short of cash. The firm obtained an extension upon \$60,000 indebtedness, payable in October. The stock of Levi M. Bates was sold by the Sheriff, at rates fairly good. The market for sterling was weak, and posted rates were reduced to \$4.86 for 60 days' and \$4.88½ for demand. The London *Economist*, of July 21, says: "As regard the shipments of gold from the United States, the probability is that they cannot be continued. No doubt

the monetary position of the States is distinctly more favorable than it was at this time last year. The Secretary of the Treasury has now been armed with power to buy Government bonds at a premium in order to prevent the accumulation of surplus revenue in the Treasury, and there is no doubt that this power will be freely exercised if necessary. Even under the most favorable conditions that now obtain in the money market it seems much more likely that the States will have to take gold from this side than that they will continue to send the metal here."

The clearings of 38 cities last week were \$818,625,687, a decrease of 4.6 ¢ as compared with the previous year. Outside of New York the clearings were \$309,237,908, an increase of 0.9 ¢. New York decreased 7.6. In Denver, Omaha, Minneapolis, St. Joseph, Milwaukee and other points in the Northwest there were heavy gains.

The imports of merchandise at this port during the week were large, amounting to \$9,743,000, of which over \$3,000,000 represents dry goods. Since January 1 the total is \$276,414,500, as compared with \$272,395,500 for the same time last year and \$250,326,570 in 1886.

According to the Custom House report the exports of specie from New York last week amounted to \$241,000, and the imports were \$82,000. Since January 1 the exports are \$25,345,800 and the imports \$5,623,500.

It has been determined by the Baltimore and Ohio authorities to immediately complete the connection between their Philadelphia extension and Staten Island via Roselle, on the New Jersey Central.

Metal Market.

Copper.—Opening during the week under review at £81. 5/, spot, Chili Bars wound up in the London market yesterday at £80. 12/6, futures meanwhile going way from £78. 10/ to £70. 15/, the total sales amounting to 200 tons and no more. Here a pool sale is understood to have perfected at 16½¢ for four months, but the exact quantity taken we have been unable to ascertain. It is stated by some that the amount is not large and indicates a falling off in consumption; others on the contrary assert that the Copper has been taken freely. On 'Change the market has been dull and flat, Spot bringing 16½¢ and January 16½¢. Yesterday the nominal quotations were, for spot and August, 16.75¢ @ 16.70¢; September, 16.75¢ @ 16.60¢; and the later months of the year, 16½¢. On July 30 the Calumet and Hecla began hoisting rock from No. 3 Calumet Shaft, making two shafts of the main mine now producing. London arrives 5/ lower this morning with both spot and futures. Good ordinary brands are £73. 5/, and Best Selected £75. 10/. Import of American Copper into Liverpool and Swansea, January 1 to July 16, 15,206 tons Fine, against 5376 tons same time last year. The position and future of the syndicate have led to a great deal of discussion in the papers and circulars, in Europe, and even in pamphlet shape, one of which we review in another column. Messrs. James Lewis & Son, Liverpool, in their circular of July 16 express themselves as follows: "A considerable number of transactions have taken place during the fortnight in Good Merchantable Copper, which includes English Best Select Ingot and Tough Cake; Lake Superior, Oxford and Baltimore Ingots; Wallaroo and Burra Cakes or Ingots; Arizona Pigs of 96 ¢ Cornish assay or over; Lata and Urmeneta Ingots; Japanese Tiles and Chili Bars of 96 ¢ or over. As a sub-committee of the London Metal Exchange has been appointed to frame a form of contract for

Good Merchantable Copper this speculative medium is now practically recognized and will to a considerable extent supplant the business hitherto carried on in Chili Bars. While benefitting foreign smelters of Copper, whose produce has hitherto been very slow and difficult of sale and will now be readily salable, this new departure will, we anticipate, prove very detrimental to the established English smelters, as it will considerably reduce the volume of their business and enable smelting to be carried on in this country with very much less capital than heretofore, thereby inducing increased competition. Much is being said and written as to the probability of an early collapse of the French speculation in Copper. In view of the disastrous results that would at present follow from this—not only to the operators themselves, but also to their guarantors—we do not think it is at all likely to take place, when it is considered that the quantity of Copper now in stock, contracted for and still undelivered must amount to fully 500,000 tons, at an average price of about £85 ½ ton, in addition to about 50,000 tons of Chili Bars in stock and to arrive, costing over £70 ½ ton, and that the abandonment of the speculation now would involve a loss on this of probably £35 and £40 ½ ton respectively. It must be borne in mind that each month the liabilities of the French operators decrease, as part of the Copper contracted for or purchased by them is delivered to consumers and a profit realized upon it. No doubt the quantity of Copper taken by consumers has proved very disappointing to those interested in the speculation, and their unsold stocks have increased to a much greater extent than they anticipated, but consumers must after awhile come to their assistance and take good part, though we do not think they will take all of the Copper arriving. By the end of the year the Copper to be carried will probably amount to over 100,000 tons, but as it is the mutual interest of the French speculators and also of producers that the value of this metal should not fall to a point that would leave a loss on its production and entirely stop the payment of dividends by the different mining companies, the latter may be induced after awhile to diminish their output to an extent sufficient to prevent further accumulation of stocks." A correspondent of the Hamburg *Börsen-halle* dwells on the fact that, at the high prices ruling, the consumption of sheathing Copper for vessels has stopped altogether; that, on the contrary, vessels at present furnish more old Copper, which is sold and the vessels leave unsheathed. Iron vessels being so cheap, vessels using a Copper bottom are hardly built any more in Europe. The correspondent goes on in the same strain, proving the falling off of the Copper demand in other directions, while the supply increases. Matters would be different, he says, if, instead of £80, the syndicate had fixed the rate at £60, at which consumption would not have abated perceptibly in all likelihood. Rio Tinto shares have been actively dealt in on the Paris Stock Exchange last week at 19¼ @ 20½ francs.

Tin.—On Thursday of last week the London quotation for spot Tin was £87. 15/, and futures stood £88. 15/; yesterday the former had advanced to £89 and the latter to £89. 10/; total sales, 405 tons. Our own market followed suit, but lacked buoyancy, there being little disposition to operate at the advance, the jobbing demand at the same time being moderate. Sales were made of 145 tons, spot at 20¢; August at 19.90¢; September at 20¢, and October at 19½¢. This morning London comes 5/ lower with both stock and futures. The spot stock in England, Hol-

land and America to-day is 10,023 tons, against 12,697 on July 1, 1888, and 5548 on August 1, 1887. **Tin Plates.**—The demand has continued steady; stocks continue light, and prices are fully sustained at following quotations for large lines on the spot: Siemens-Martin Steel, Charcoal finish, \$4.85 @ \$5.25; ditto Coke finish, \$4.75; Terns, \$4.30 @ \$4.40; Bessemer Cokes, \$4.45 @ \$4.60, and Wasters, \$4.20 @ \$4.25. Coke Tins are selling at 13/3 in Liverpool, for prompt delivery.

Lead.—There being little Lead available in second hands the scarcity of spot caused the market to harden, and the trifling purchases made by consumers, in all about 300 tons, had to be satisfied at a higher range, beginning at 3.95¢ and ending at 4.12½¢, as much as 4.15¢ having been paid, but the actual spot market value to consumers being 4¢ at the close. The chief operator has been pushing prices, and some 700 tons changed hands on the Metal Exchange, August and September at 4¼¢ @ 4.17½¢. St. Louis quotes 3.90¢, and Chicago 3.95¢ @ 4¢. In London Soft Spanish has not served from £13, while English Pig gave way from £13. 7/6 to £13. 5/. At the Metal Exchange to-day 400 tons August, September and October were sold at 4.17½¢, the last sale being 50 tons August at 4.15¢. Stocks of Lead in Spain are large still, and it is doubtful whether makers over there can agree to reduce production from now forward.

Spelter.—The market for ordinary brands of Domestic has been looking up in consequence of higher prices insisted upon by makers out West, and some business has been transacted at 4¼¢, while Silesian remains 5¢, there being a decline in London from £16. 2/6 to £16. Advises by mail from Silesia state that production latterly declined a little, the yield not being as good as it was previously.

Antimony.—Has been moving off regularly in a jobbing way at 9¼¢ Hallett, and 13¼¢ Cookson.

New York Metal Exchange.

The following sales are reported:

THURSDAY, JULY 26.	
10 tons Tin, September.....	19.00¢
32 tons Lead, spot.....	3.87½¢
48 tons Lead, August, seller's right to double.....	3.90¢
50,000 lb Balto. Copper.....	15.25¢
FRIDAY, JULY 27.	
100 tons Lead, July.....	3.90¢
16 tons Lead, July.....	3.92½¢
16 tons Lead, December.....	4.00¢
MONDAY, JULY 30.	
10 tons Tin, spot.....	20.00¢
10 tons Tin, September.....	20.00¢
25,000 lb Copper, January.....	16.25¢
48 tons Lead, September.....	4¼¢
TUESDAY, JULY 31.	
10 tons Tin, August.....	19.90¢
25 tons Tin, October.....	19.50¢
25,000 lb Copper, spot.....	16.75¢
WEDNESDAY, AUGUST 1.	
50 tons Lead, spot.....	4.25¢
132 tons Lead, August.....	4.17½¢
97 tons Lead, September.....	4.17½¢
49 tons Lead, October.....	4.17½¢
81 tons Lead, August.....	4.15¢

Coal Market.

The Anthracite Coal trade is reported as occupying a stronger position. The deliveries under orders given prior to the advance being now quite active, while the wholesale dealers, it is said, refuse new applications at anything below the net circular prices last promulgated. Transactions at the latest advance, however, are as yet comparatively limited. As a whole, the business done in July is said to have exceeded that of any corresponding month on the record, thus reflecting the improved industrial situation, especially so far as relates to the manufacture of Iron. The quantity of coal forwarded to market

during the last few days, as appears from the statistics given below, is not quite so large, at least so far as concerns the Lehigh and Reading districts. Judging from indications the chief operators are well satisfied both with the position and prospects, and as to prices and railroad tolls are content to let "well enough" alone. The several conferences held during the past week having brought about no change in any respect. The promise now is for a steady business during the remainder of the season. The possibility of an advance September 1 is intimated, but of this nothing definite can be said until a contemplated meeting of sales agents, August 15. The Western demand is heavy, but is embarrassed by a lack of transportation facilities. At loading ports vessels have to wait their turn. Freight to Boston are about 85¢ from New York and 90¢ from Philadelphia.

Hard coal rates from Chicago to northwestern points have been advanced to \$3.50 per ton, the highest rate ever in effect.

The Anthracite Coal production for the week ended July 28 shows a shortening up compared with the previous week, the total being 824,836 tons, a decrease of 62,500 tons, but for the year to date there is an increase of 255,000 tons, the aggregate from all the mines since January 1 having been 19,608,883, as against 19,353,000 for the same time in 1887. The heaviest receipts of Coal are from the Wyoming region, which shows a growing proportion, amounting last week to nearly 500,000 tons. Quotations are as follows: Wyoming Free Burning, f.o.b. at South Amboy and Weehawken, Broken or Grate, \$3.85; Egg, \$4.15; Stove and Chestnut, \$4.50; Reading Hard White Ash, Chestnut, \$4.40; Stove, \$4.50; Egg, \$4.25, and Broken, \$4.10. The small steam sizes can be bought as low as \$2.40, and Buckwheat, \$2 @ \$2.10 f.o.b.

Bituminous Coal is quiet at \$3.25 per ton, f.o.b. The Cumberland and Clearfield product last week was 125,000 tons, which is a slight increase compared with last year. Since January 1 the total is 3,859,418 tons, an increase of 230,000 tons compared with 1887. It is reported from Philadelphia that the New Jersey Central Railroad has purchased a controlling interest in the Lehigh and Hudson River Railroad, which it will use to aid it in reaching the Poughkeepsie Bridge. Joseph S. Harris, who is vice-president of the Jersey Central, is also president of the Lehigh Valley Coal and Navigation Company, which is under contract with the Lehigh and Hudson River Company to ship a large amount of coal over its road annually.

Old Metals, Rags, &c.

The purchasing prices offered by dealers are as follows:

Heavy Copper.....	\$5.10 @
Light Copper.....	@ \$0.08
Copper Bottoms.....	@ .08
Brass, Heavy.....	@ .07½
Brass, Light.....	@ .08
Composition.....	@ .09½
Lead, Heavy.....	@ .03½
Tea Lead.....	@ 2.00
Zinc.....	@ .03
Wrought Iron.....	16.00 @
Light Iron.....	7.50 @
Stove Plate Iron.....	8.50 @
Machinery Iron.....	12.00 @
Grate Bars.....	@ 5.00
Old Rubber Springs.....	@ .05
Old Rubber Shoes.....	@ .01½
White No. 1.....	@ .03½
White, No. 2.....	@ .01½
Canvas, Linen, No. 1.....	@ .04
Canvas, Cotton, No. 1.....	@ .04½
Canvas, No. 2.....	@ .02½
Seconds.....	@ .01
Soft Woollens.....	@ .06½
Mixed Rags.....	@ .01
Gunny Bagging, No. 1.....	@ .02
Jute Butts.....	@ .02
Book Stock.....	@ .01½
Newspapers.....	@ .00¾
Waste Paper.....	@ .00¾
Hemp Twine.....	@ .03
Sisal Baling Rope.....	@ .03½

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, August 1, 1888.

The Copper market, while displaying no remarkable activity, has developed more pronounced firmness. Consumers have purchased to a fair extent, and an increased demand has sprung up for cash "warrants." This demand comes mainly from parties who sold three months' futures "short" some time ago, the deliveries on which fall due August 1 and September 1. As in previous months since the syndicate had control, "cash" are found to be scarce just at the time they are most wanted, and the syndicate relieves the scarcity only when the "shorts" bid prices up high enough to make it an object for them to let a few "warrants" out. Hence the gradual rise on prompts from £79. 10/ to £81, while futures have advanced to a very moderate extent only. There have been further large transfers of Chili Bars from Liverpool to France, thus placing supplies more closely than before under complete control of the syndicate and its allies. Business under the new form of contracts, on which Good Merchant Brands are a good delivery, is exceeding that doing in Chili Bars. It is estimated that fully 750 tons have been turned on the new form since the innovation went into force, and syndicate brokers have been most conspicuous among the buyers. Arizona Pig has changed hands to a considerable extent at an average of about £73 during the past week.

Speculation in Pig Tin has been only moderately active, but the transactions in this form, together with quite extensive purchases by consumers, make up a large total business. The dealings have extended through all positions—prompt, 30 days, 60 days and three months' future deliveries—imparting considerable strength to the market. Prices have reacted somewhat the past few days under realizations by speculative holders.

There has been a sharp demand for Bessemer Steel Tin Plates, the spot supply of which is now very light, and the near future output well under the control of orders. Other Coke Plates are also in very good position. This fact coupled with the advance on Pig Tin and reported large orders from the American market causes makers to hold off for still higher prices. An advance has been paid for certain favored brands. Views taken on the American tariff bill have caused considerable stir in the trade, and preparations are said to be making for a larger business. It is stated that prominent parties are selecting sites for new mills and also in treaty with owners of idle works to engage in the manufacture of Plates.

The several branches of the Pig Iron market have continued strong and a further advance in prices all along the line has taken place. The improved statistical position in the Middlesboro' district has been a prominent factor, but a better demand for Scotch and Bessemer Pig has helped to change sentiment and caused heavy buying of "warrants" by brokers to cover recent "short" sales. There seems to be a more or less general belief that prices have touched the lowest point that will be recorded for this year.

The Steel mills in most localities are very busy in nearly all departments on back orders, and new business is coming in to a very encouraging extent in several branches. In fact, the conditions are such that values show a hardening tendency nearly all through.

The demand from Italy for Old Iron Rails seems to have completely died out, and the market for Old Material in general is now decidedly flat.

The average price in the North of England for manufactured Iron the past two months is officially reported as £4. 13/11.

Another new furnace is being erected by the Lynvitondu Works.

Scotch Pig.—Firm market with fairly active demand:

No. 1 Coltness, f.o.b. Glasgow	43
No. 1 Summerlee, " "	47 6
No. 1 Gartsherrie, " "	44 6
No. 1 Langloan, " "	44 6
No. 1 Cambro, " "	39 6
No. 1 Rhotts, " at Leith	45
No. 1 Gtengarnock, " Ardrossan	43 6
No. 1 Dalmeilington, " "	40 6
No. 1 Eglinton, " "	39 9
Steamer freights, Glasgow to New York,	
5; Liverpool to New York	7/6.

Cleveland Pig.—Continues strong and selling freely at the advance. No. 1 Middlesboro', G.M.B., 35/6; No. 3 do., 33/.

Bessemer Pig.—Good demand and prices strong. West Coast brands, mixed numbers, 43/ @ 43/6, f.o.b. shipping point.

Spiegeleisen.—Firm market with the demand fair. English 20 % quoted 80/, f.o.b. N. W. England shipping point.

Steel Rails.—Demand still fairly active and prices steady. Standard sections quoted at £3. 17/6, f.o.b. at N. W. England shipping point. Middlesboro' district 2/6 less.

Steel Blooms.—Market quiet but steady. We quote at £3. 12/6 @ £3. 13/ for 7 x 7, f.o.b. at N. W. England shipping point.

Steel Billets.—A fairly good trade at steady prices. Bessemer, 2½ x 2½ inch, £3. 17/6 @ £3. 18/3, f.o.b. at N. W. England shipping point.

Steel Slabs.—Not much doing, but prices steady. Bessemer, £3. 16/3, f.o.b. at N. W. England shipping point.

Steel Wire Rods.—The demand moderate and prices barely steady. Mild Steel No. 6 quoted at £5. 12/6 and No. 5 at £5. 10/, f.o.b. at N. W. England shipping point.

Old Rails.—Very little demand; prices nominal. Tees quoted at £2. 15/, and Double Heads £2. 17/6, c.i.f., New York.

Scrap Iron.—Slow market; prices rather weak. Heavy Wrought quoted at £2. 5/, f.o.b.

Crop Ends.—Market quiet and unchanged. Bessemer quoted £2. 5/ @ £2. 7/6, f.o.b.

Tin Plate.—A good demand, particularly for Cokes, and the market firm. We quote, f.o.b. Liverpool:

1C Charcoal, Allaway grade	14/6 @ 15/
1C Bessemer steel, Coke finish	13/ @ 13/3
1C Siemens	13/3 @ 13/6
1C Coke, B. V. grade	13/ @ 13/3
Charcoal Terne, Dean grade	12/6 @ 12/9

Manufactured Iron.—There is a very fair business at steady prices. We quote, f.o.b. Liverpool:

Staff, Ord. Marked Bars	£ s. d. @ 7 10 0
" Common	4 17 6 @ 5 0 0
" 11½ Sheet, singles	@ 6 15 0
Welsh Bars (f.o.b. Wales)	4 12 6 @ 4 15 0

Tin.—Fairly active market, with undertone firm. Straits quoted at £88. 12/6 @ £88. 15/, spot, and £89 @ £89. 5/ for three months' futures.

Copper.—A good business doing, mainly speculative. Market firm. Chili Bars closed at £80. 5/ @ £80. 10/, spot, and £77. 10/ @ £78 three months' futures. Best Selected, £75 @ £75. 10/.

Lead.—Less active demand, and market not so firm. Soft Spanish, £13 @ £13. 5/ at the close.

Spelter.—A fair business at steady prices. Silesian, ordinary, £16 @ £16. 2/6 at the close.

Cost of Crushing Magnetite.

In a paper read by Theodore A. Blake, of New Haven, Conn., before the American Institute of Mining Engineers, the following results are given as having been secured by Blake multiple-jaw crushers and coupling jigs at the new mill of the Chateaugay Ore and Iron Company, at Lyon Mountain, N. Y., on magnetite crushing down to ¼-inch size for separators. The actual amount crushed from September 26, 1886, to January 1, 1888, was 122,814 long tons or 137,551 short tons, at a cost for crushing and concentration of \$42,200.55; or 34.36 cents per long ton, or 30.67 cents per short ton, distributed as follows:

	Total.	Per gross tons.
2018 1836-2240 tons of coal	\$8,612.37	\$0.07
Labor	21,000.72	.17
Oil waste, &c.	2,374.30	.02
Mill supplies, renewals, and repairs	10,205.16	.08
Total	\$42,200.55	\$0.34

This economy is certainly remarkable, and still more so when we consider the prevailing unfavorable conditions as regards successful screening of the ore. Had the ore been reasonably dry instead of being generally wet and, during the winter months, frozen, or if the crushing after the passage of the 30 x 5 crushers had been "wet" instead of dry and the screening in that way made perfect as it can be, the actual average daily product could have been increased, even doubled, and the cost of crushing and concentrating per ton of crude ore reduced to less than 25 cents.

Filtration of Waste Oil.

Referring to the filtration of waste oil, *Engineering* remarks: The exact nature of the functions exercised by molecules of oil in lubricating surfaces, like many other physical questions, merely leads to hypotheses, without any exact solution which determines what is lubrication. From extended experiments and observations upon the subject, the conclusion has been arrived at that oil in lubricators never "wears out." Its lubricating properties are impaired by holding dust and metal in suspension, by volatilization of the more fluid portions, and by oxidation, but the remaining portion of the oil still performs its original function. The lack of knowledge on the subject of lubrication pertains to how to use oil rather than what oil to use. The separation of oil dripping from heavy journals is easily performed by filtration through a cask of sand or charcoal, with a piece of cloth at the top to remove the coarser impurities. If the lard or sperm oil used has "gummed" to a considerable extent, an admixture of mineral lubricating oil will dissolve much of the thick material, and improve the character of the filtrate as a lubricant.

The fluidity of oil is so much greater at high temperatures that this process is much more satisfactorily accomplished at a temperature of 100° F., and a steam coil may be used to advantage, or the filter may be placed in some warm place; in either case the hazard of fire from spontaneous ignition or from the inflammable vapors arising from the oil must be guarded against by carrying on the work in some cheap shed or suitable place where fire would not result in disastrous consequences. Oil is removed from metal turnings by means of a centrifugal extractor which is surrounded by a steam jacket, and the oil thrown out by the extractor is ready for use on cutting tools, but should be filtered before being used for lubrication. The first centrifugal extractor was designed for the purpose of separating syrup from granulated sugar in the process of sugar manufacture, but to the disappointment of the inventor its use was satisfactory only for a few minutes, after which the syrup would gum upon the perforations in the sides of the revolving cylinder, and prevent its further operation. Numerous experiments in the way of scrapers and other mechanical devices did not remove the difficulty, until a bystander casually remarked that a jet of steam would allow the syrup to flow continuously, and this suggestion led the way to successful operation of the machine.

Electric Carbon Filaments.

Some interesting observations relative to the carbon filaments of incandescent lamps have recently been made. In testing chemically certain filaments said to be of a material other than carbon, Mr. Desmond G. Fitz-Gerald boiled them in strong sulphuric acid, with the view, if carbon were present, of obtaining carbonic oxide and sulphurous acid according to the reaction $H_2SO_4 \times C = CO \times H_2SO_3$. No such reaction occurred, the filaments in question remaining unaltered. Before committing himself, however, to the conclusion that no carbon was present, the experimenter took the precaution of repeating the experiment with filaments known to be of carbon. These filaments also remained unaltered after prolonged boiling in the acid. The result justifies the conclusion that the carbon of the lamp filaments, unlike ordinary carbon, is not acted upon by sulphuric acid at its boiling point. The *Electrical Engineer* says: "It confirms also the conclusion arrived at by Mr. Anthony, that the molecular constitution of a filament of carbon, obtained by heating to a redness a filament of organic matter, becomes modified when the material is subjected for a certain period of time to the comparatively high temperatures obtained by its incandescence as a lamp filament. Mr. Anthony found that this molecular change is indicated by an increase in specific resistance of the carbon. Operating with a new filament, he observed that a diminution in its resistance occurred at a comparatively low temperature, and that the resistance steadily diminished as the temperature was augmented. But after the filament had been allowed to cool, its initial resistance was found to have been augmented. The same fact has been observed by other investigators; but one of Mr. Anthony's results is probably altogether novel. Operating with certain incandescent lamps taking currents of six, eight and ten amperes, and giving luminous intensities of 32, 65 and 125 candles, he found that the resistances of the filaments had appreciably diminished after the lamps had been working for from 200 to 300 hours and that subsequently the resistance steadily increased up to a certain point as the working was continued."

Hardware.

The general tone of the market is rather unsatisfactory, and prices are not regarded as very firm. This impression is strengthened by the fact that there are at the present time several lines of goods the price of which has recently fallen away to a greater or less extent. Buyers are accordingly rather cautious about placing their orders, showing a disposition to hold off, with a view to ascertaining whether or not there are to be further declines. With this exception the condition is regarded as promising well, the general prosperity of the country, the expectation of fine crops and increased activity in some lines, with an improved demand for Hardware, giving promise of a good fall trade. In the opinion of some well-informed parties, prices are likely soon to recover somewhat in tone, and the opinion is expressed that in some lines which are now low and irregular, those who defer purchasing will very likely have to pay something of an advance on present quotations.

Cut Nails.

The New York market remains in the same condition, good brands selling in carload lots at \$1.90 to \$1.95, while outside lots are occasionally offered at concessions. Small lots from store command \$1.95 to \$2. Reports from the West indicate that the proposed Nail pool had suffered a set-back there a week ago, but that now prospects have improved. A meeting of the Western Nail makers is to be held between the 15th and the 20th of the current month. There is little hope that the Eastern makers will enter any arrangement for the present.

Wire Nails.

To-day a new Wire Nail pool goes into effect, to which, it is reported, the leading mills are parties. It is of special interest, since the basis differs radically from the usual method of such associations. In its general outline it is as follows: Monthly reports are made of the quantities sold and the prices realized by each mill. Those who have sold below a fixed standard price pay into the Association a sum equal to the difference in the price realized on the quantity marketed, and the sum which the sales would have fetched at the standard price. The amount thus collected is distributed *pro rata* of sales among the members. Let it be assumed, to illustrate this arrangement, that the standard price is \$2.50, and that six mills have made the following report:

Mill.	Sales.	Price.	Realized
A.....	20,000	\$2.25	\$45.00
B.....	15,000	2.30	39,500
C.....	20,000	2.40	48,000
D.....	25,000	2.50	62,500
E.....	10,000	2.60	26,000
F.....	10,000	2.75	27,500
Total.....	100,000		\$248,500

Under the arrangement A would have to pay \$5000; B, \$3000, and C, \$2000, a total of \$10,000. Redistributing, the result would be:

A.....	\$45,000 - \$5,000 + \$2,000 =	\$42,000
B.....	39,500 - 3,000 + 1,500 =	38,000
C.....	48,000 - 2,000 + 2,000 =	48,000
D.....	62,500 + 2,500 =	65,000
E.....	26,000 + 1,000 =	27,000
F.....	27,500 + 1,000 =	28,500
		\$248,500

It will be seen that the low sellers would not alone suffer from reduced revenue, but would have to be content to have their income cut down still further by paying penalties larger than their share of the sums so collected, while those who hold out for high prices get a bonus besides.

Barb Wire.

The market continues without marked change, but prices on large lots are slightly shaded, while the nominal quotations re-

main as before. The market has been characterized by the dullness usual at this season, but we are now advised of some signs of increased activity.

Washburn & Moen Mfg. Company and I. L. Ellwood & Co., under date July 14, have issued a circular relating to Barb Wire litigation, explaining the recent withdrawal of their application for a temporary injunction against the Braddock Wire Company, to which we have heretofore referred, and stating that the litigation will be earnestly prosecuted.

Miscellaneous Prices.

Coes Wrench Company, Worcester, Mass., issue a price list and circular of their L. Coes's Patent Knife Handle and Mechanics' Wrenches, in which the special features of these goods are alluded to and *fac similes* of their labels given in color. Referring to this line of goods the following joint announcement as to prices and terms is made by the agents, J. C. McCarty & Co., 97 Chambers street, New York, and John H. Graham & Co., 113 Chambers street, New York:

To the Trade: The consolidation and incorporation of Messrs. L. Coes & Co. and A. G. Coes & Co., of Worcester, Mass., under the title of the Coes Wrench Company, renders it necessary for the subscribers to issue a joint circular instead of separately, as heretofore. We are instructed by the new corporation to quote the following prices—viz.: L. Coes & Co.'s Knife Handle Wrench as well as A. G. Coes & Co.'s make, 55 per cent. discount from list.

A special discount of 10 per cent. will be allowed on specified orders for 50 dozen for immediate shipment.

Mechanics' Wrenches will continue to rate at 10 per cent. less than the Genuine, and are subject to same quantity schedule.

Terms 90 days, or 3 per cent. cash 10 days.

Parties having purchased the quantity will be entitled to the extra discount on subsequent orders during the balance of the season ending December 31, 1888.

As both L. Coes & Co.'s Knife Handled Wrench and A. G. Coes & Co.'s pattern are made by the same company the trade can obtain either style from either of the agencies as above. For the convenience of the trade the Coes Wrench Company in their circular state the opening capacity of each size Wrench and contents of cases as follows:

Size Wrench..... 4 6 8 10 12 15 18 21 in.
Will open..... 1 1/4 1 3/4 1 1/2 2 1/4 2 3/4 3 1/4 in.
Cases contain..... 6 6 6 6 6 6 6 2 1 doz.

Eagle Carriage Bolts are irregular and considerably lower prices than recently prevailed are now being made.

The competition of outside makers of Horse, Curry and other Cards is more formidable than it has heretofore been, and somewhat lower prices are ruling.

The market for Rope is characterized by exceptional firmness and an advance of 1/2 cent has been made in Manila, while Sisal is held very firmly at ruling prices.

The improved condition of things in Wrought-Iron Pipe, to which we have heretofore referred, still continues, and, while there has been no advance in price, quotations are firmly maintained, and manufacturers are less disposed than formerly to make concessions.

Manufacturers of Squares have advanced the price of No. 1 Iron from \$6 to \$8 per dozen. The discounts which they are making are, however, without improvement, the tendency being apparently toward slightly lower prices. In this line of goods the market is in a decidedly unsatisfactory condition.

The following are the prices in dozen lots of the Peabody Door Spring, described on page 57, and put on the market by A. W. Paine, Peabody, Mass., special prices being made on gross lots.:

	Per gross.
No. 1 for Screen and House Doors.....	\$15
No. 2 for Store Doors.....	18

The Postal Package Company, 34 South Paca street, Baltimore, Md., advise us that the price of their Torches, illustrated on page 185, without sticks or wicks, is \$150 per 1000, with a trade quantity discount.

The following are the list prices of J. F. Wollensak's Lever Latch and Handle, put on the market by J. F. Wollensak, Chicago, Ill. A description of this article was given in our last issue. The list given is subject to a discount of 40 per cent.:

	Per dozen.
No. 102 Polished Brass.....	\$21
No. 102 x 1/2 Nickel Plated Brass.....	24
No. 0102 Japanned Malleable Iron.....	9

There appears to be some uncertainty in regard to some of the list prices on Emery Wheels, as adopted by the Association, some changes having been made or suggested since the meeting of the manufacturers.

Ammunition.

The general situation remains without substantial change, with increasing probability, however, that something will be attempted before long with a view to correcting existing irregularities. While we are advised that the E. C. Meacham Arms Company have not made formal application to the association to be reinstated, they have undoubtedly expressed to influential parties closely connected with the association their desire to be restored to their former position. Whether or not this will be considered feasible or desirable is a question, but the large trade would welcome any action on the part of the association to relieve the situation of its uncertainty and irregularity in prices. The extent to which concessions contrary to the scheme of the association are made by the Special and "A" houses, thus making it feasible for many outside parties to obtain their goods on as favorable terms as if in contract with the association, while they are free to sell at any terms they please, a liberty which they often use to advantage in the conduct of their business, is the real difficulty in the situation. The opinion seems to gain ground among well-informed parties that some recasting of the existing scheme is not improbable, and it is possible that the association may sooner or later take action, by which the large trade will not be given so complete a protection in margins of profit as the present scheme, in too many cases unsuccessfully, endeavors to secure them.

The Alford & Berkele Company,

77 Chambers street, New York, call attention to their specialties in Firearms as follows: Remington's New Line Revolvers, manufactured by E. Remington & Sons; Remington's System Breech-Loading Shotguns, manufactured by Whitney Arms Company; Unique Automatic Revolvers, manufactured by C. S. Shattuck, and Sterling American Bulldogs, manufactured by E. L. Dickinson expressly and exclusively for them. They are also agents for the American Buckle and Cartridge Company, manufacturers of Paper and Shot Shells, and the American Gun Implement Company, manufacturers of Breech-Loading Gun Implements, Fowler's Patent Glass Shells, &c. The following quotations on their specialties in Firearms will be of interest:

Remington No. 3 (Smooth's Patent) Latest Model, New Line.—Octagon Barrel Fluted Cylinder, Patent Shell Ejector, Checkered Rubber Stock, Saw Handle, Flat Butt, five shots; 38 Cal. S. & W. C. F., or 32 S. R. F., 3 3/4-inch Barrel; weight, 1 pound. Prices: Nickeled, \$3.50; Nickeled, Engraved, \$4.50; Nickeled, Ivory, \$4.50; Nickeled, Pearl, \$5; Nickeled, Ivory Engraved, \$5.50; Nickeled, Pearl Engraved, \$6.

Nos. 1 and 2 Wrought Steel Frame and Barrel in one piece. In all other respects like the above, except in the shape of Stock, and the Calibers, of which No. 1 has 30 Cal., No. 2, 32 Cal. Both rim fire. Prices: No. 1, \$2.25; No. 2, \$2.75; Extra for Ivory Stock, 75 cents;

Extra for Pearl Stock, \$1.13; Extra for Engraving, \$1.

Sterling American Bull Dog.—Double action or self-cocking. Weight, 16 ounces; Center fire; five shot; Rubber Stock. Long Fluted Cylinder, Saw Handle, Octagon Barrel, 3½-inch Barrel only; No. 832, 32 Caliber, \$1.65.

Shattuck's "Unique" Revolvers.—Thirty-two Caliber; center fire; Rubber Stock, Saw Handle, Octagon Barrel, Fluted Cylinder, Swing-Out Cylinders, price \$1.75.

S. & W. Model Revolvers—"K. of L."—Thirty-eight Caliber, five shots, Double Action, Safety Hammer, Center Fire, Rubber Saw-Handle Stock, Fluted Cylinder, \$1.75.

British Bull Dog—Rebounding Hammer.—"S. & W." C. F. Cartridge, Full Nicked Rubber Stock, All Steel, seven and six shots. Length of Barrel, 2¼ inches; full length, 6 inches; weight, 16 ounces, \$1.50. "Ryan's" New Model Ribbed S. & W. Model Barrel, 32 and 38, \$1.65.

No. 4 New Model Remington.—Round Barrel, Fluted Cylinder, Checkered Rubber Stock, five shot, 38 Caliber, Rim Fire. Length Barrel, 2¼ inches; length Revolver, 6¼ inches; weight, 12 ounces. Steel Barrels, Frames and Cylinders—Prices: Plated, \$2.25; Plated, Engraved, \$3.25; Plated, Ivory, \$3.25; Plated, Pearl, \$3.75.

Shattuck's "Unique" Automatic Revolvers.—Thirty-two Caliber, Rim Fire, Rubber Stock Saw Handle, Octagon Barrel, Fluted Cylinder; Swing-Out Cylinders, price, \$2.10.

Remington System Breech-Loading Single Barrel Shot Guns.—No. 2, Blued Barrel, Walnut Stock, Case-Hardened Mountings, 16 B Gauge, weight, 6¼ pounds, 32 inch Barrel, \$7.

They make the following quotations on the goods of the American Buckle and Cartridge Company:

	Discount, per cent.
Paper Shot Shells, IXL, waterproof. .40 and 5	
Paper Shot Shells, special quality, not waterproof. .40 and 10	
Brass Shells, Fowler's patent, 10 and 12 gauge, per hundred.	\$3.25

The above prices are 60 days, or 2 per cent. for cash in 10 days.

The company also state that they are prepared to fill orders on Ammunition at prices which are always under those of the combination, and that they can supply any make desired, with prompt delivery.

Items.

It is announced that Crowell & Worthington Company have purchased of Tiffany & Co., Providence, R. I., the Hardware business conducted by them for the past 38 years at 72 Weybosset street, where they will continue it as jobbers of Hardware and Tools.

Horton, Gilmore, McWilliams & Co., of Chicago have now got in part of their line of Union Pocket Knives, Shears and Scissors. The total weight of one order received by them last week was 13,000 pounds, which took a gang of 30 floor-men half a day and one night to unpack and arrange on the shelves and the reserve stock floor. Three duplicate orders of the same size are on the way. To accommodate this stock will require shelving 180 feet in length and 10 feet in height. The Pen Knives are being made up for this house in entirely new styles and new patterns, special attention being given to their finish. The blades are marked on both sides of the hilt, the "Union Cutlery Company" appearing on one side and a double knot on the other. The firm are now in the market ready to take orders for these goods. Five traveling men, in addition to these referred to in a previous article, were engaged last week to sell specialties. The largest jewelers' tray factory in Chicago has for the past two weeks been running exclusively on traveling men's sample cases for this firm alone, and the force was insufficient and had to be enlarged to fill the order on time.

A recent issue of the London *Ironmonger* contains the following curious and amusing statement in the letter of its Sheffield correspondent, in regard to the importation of a well-known line of Sheep Shears:

In the United States the firm have also an improved trade, due to a successful stroke on

the part of one of their customers. This gentleman contended that the Shears sent him by Burgon & Wall were wrongly classed at the Custom-House—that they were large Scissors, and not Shears proper. The contention was sustained, and the Shears were admitted as Scissors at 12½ per cent., instead of having to pay the 45 levied on Shears. As the immediate result of this 'cute' movement the orders coming to Burgon & Ball from the States increased very considerably.

C. F. Guyon & Co., 97 and 99 Reade street, New York, in their advertisement on page 81 give in an attractive form the names of the different manufacturing concerns for whom they are agents. It will be observed that a number of leading houses are thus represented.

J. T. Henry, Hamden, Conn., issues a circular relating to two new patterns of Pruning Shears. No. 22 is a Ring Shears, with spiral spring without guards, and is described as one of his very best grades. No. 32, his Connecticut Pattern, with spiral springs, and is referred to as a well made, strong, popular and durable Shear.

The following are the terms in which application was made to a Hardware house by a person desiring a position as traveling salesman:

A traveling salesman who can drink rum, play poker, sell a few goods and raise h—generally would like to make a new deal. Have you any use for such a man? Address, "W. O. R. K.," P. O. box —, Boston, Mass.

N. B.—You can secure this man for something less than \$10,000 a year.

It is scarcely necessary for us to say that no engagement was made, and that the application was not regarded as requiring a reply. There is in the Hardware business, as in other lines, but little use for salesmen of the above type, the position of the commercial traveler calling for the best abilities and sterling worth.

The trade will observe the advertisement on page 76, in which the Enterprise Mfg. Company, Philadelphia, Pa., illustrate some of their Mills and call attention to the other goods of their manufacture.

E. Covert Mfg. Company, Farmer Village, N. Y., issue an exceptionally neat and well-printed catalogue of their Neck Yoke Centers, Neck Yokes and specialties in Saddlery, Coach and General Hardware. Among the specialties are to be noticed their Wagon Jack, Umbrella Rack, Adjustable Blotter and others. The catalogue gives a full description of the goods, with illustrations and list prices, which are subject to a general discount of 25 per cent.

A. H. Andrews & Co., 195 Wabash avenue, Chicago, Ill., issue a circular describing Culp's Patent Motor, which is designed especially for show windows. By this contrivance a table or platform containing goods is kept in constant revolution, thus making an attractive display. It is used in some Hardware stores with good effect.

Wm. Bryce & Co. and H. B. Newhall Company played a game of base-ball at Prospect Park last Saturday, July 28. Game was called in the seventh inning, two of Newhall's men being disabled, when the score stood 29 to 7. The umpire called the game back to the sixth inning, when the score stood as follows:

Innings.	1	2	3	4	5	6
W. B. & Co.	4	5	5	4	4	2—22
H. B. N.	3	0	2	0	2	0—7

Kerr Bros. & Co., Hicksville, Ohio, besides their regular line of Ash Handles, Cant Hooks, Cant Hook Handles, &c., also make Flag Poles and Campaign Torch Handles and Sticks.

It will be seen from the Special Notice on page 51 that Ryan's Improved Shingling Bracket is offered for sale. This patented device, which has been to a good extent introduced throughout the country,

is referred to as satisfactory in its working. The patentee desires to dispose of it to some party who can manufacture advantageously, perhaps in connection with other goods. A sample of the Bracket can be seen at this office, and Mr. Ryan may be addressed as stated in the advertisement.

It will be observed that Underhill, Clinch & Co., in their advertisement on page 64, call prominent attention to the fact that they carry a stock of Russell Jennings' Auger Bits, and allude also to other lines to which they give a prominent place.

An illustration of Moon's Patent Iron Lever Cutting Box, manufactured by the Wayne Works, Richmond, Ind., is given on page 96. This machine, which has been on the market for some time, is referred to as having given entire satisfaction, and is alluded to for its convenience, comparative inexpensiveness, and the efficiency of its working.

When the late William A. Ives went to New Haven, about 40 years ago, it was with the intention of passing the remainder of his life there without attending to business. He had a moderate fortune, esteemed sufficient for his wants. His active temperament would not, however, allow him to remain idle, and in a few years he became interested in the business of making Boring Implements. For more than 35 years he devoted himself to it without intermission, becoming one of the prominent New England manufacturers. This attention to business was continued to the last, and even on the day before his death he gave specific instructions concerning its future management. An appreciative tribute is paid to his intelligence, character and sterling worth by the Rev. Dr. Munger in an address made at his funeral.

Hibbard, Spencer, Bartlett & Co., Chicago, Ill., have issued, under date July 20, a 20-page price current referring to a varied line of goods—Tin Plate and Metals, Campaign Torches, Cutlery, Apple Parers, Lamps and Lamp Stoves, Axes, Guns, &c.

New Haven Staple Works, New Haven, Conn., in referring to their patent-made Staple, refer to the stiffness given it by the cold drawn process of making, thus allowing the Staples to be driven into harder wood than others without spreading in the bend. Referring further to this matter they say:

What is apparently lost in our Staple through necessity for clinching is offset by the fact of the stock being drawn out ½ inch and over, thus giving a rigid and sharp point for entering the hardest woods, and still retaining malleability enough to be clinched smoothly. Nearly 20 years' experience has enabled us to produce Staples in Iron, Steel, Brass or Copper Wire in either bright, japanned, galvanized or tin finish, and thanking the trade for these years of patronage we hope by persevering application to merit further favors.

Their label represents the pattern of their Staples and contains the motto, "The nimble sixpence is better than the slow shilling."

The trade will observe the advertisement of the Francis Axe Company, Buffalo, N. Y., printed in color and occupying page 68. It represents one of their All Steel Axes, full size, and shows also their Axe Wedge and Axe Bit Stone. The company are making largely All Steel Polished Axes, both etched and labeled, in addition to the Standard Axe. They refer to the fact that low prices are now ruling in Axes, while Steel, Coal, Borax, Emery, Grindstones and Boxes are higher than last year.

"Handy Notes and Queries" is the title of a pamphlet published by Henry Hopkins & Co., 99 Reade street, New York. It contains a variety of useful information relating especially to Hardware, Tinware

and Metals, giving many tables in regard to a variety of matters connected with these lines. It is a pamphlet of 160 pages, and the variety of its subject matter is indicated by the table of contents, which occupies seven pages. A good deal of new matter appears for the first time in this edition.

In their colored page advertisement, occupying page 67, the Shepard Hardware Company, Buffalo, N. Y., illustrate their Shepard's Lightning Quadruple Motion Freezer, and allude to it as the Freezer of the future. The special points that are made in regard to it will interest the trade. At the same time they allude to their Fruit Presses, Blind, Shutter and Gate Hinges, Stove Dampers and miscellaneous goods, calling attention to the variety of manufactures which they put on the market.

We see by one of our exchanges that the Allen & Jemison Company, Tuscaloosa, Ala., have been awarded the contract for furnishing the Lumber, Shingles, Hardware, Cement, &c., necessary to the completion of the locks and dams now being constructed above the city.

By the special notice on page 51, it will be seen that the advertiser, who may be addressed as Meta, *Iron Age* office, desires quotations on 350 gross Tinned Malleable Iron Keys.

L. E. Wright, Douglass, Kansas, announces July 25 that he has sold his Hardware and Implement business to Woodyard & Imus, who are commended to his patrons as his successors.

The Fraim Lock Works, Lancaster, Pa., have appointed C. F. Guyon & Co., 99 Reade Street, New York, as their sole agents for the Middle and Southern States, and Cutler, Woodrough & Co., Boston and Chicago, for the Eastern and Western States, for the sale of their improved Scandinavian Padlocks, to whom orders and inquiries should be addressed. They allude at the same time to the merit of their Jail Padlocks, which are made of malleable iron throughout. The cheaper grades are painted red, with polished shackles and keys. The better grades are put up with flat steel keys, making them susceptible of many changes.

It has recently been charged against the Stanley Rule and Level Company that they are very dull, to be willing to manufacture one tool—called "Odd Jobs"—embracing nearly their whole line; and then sell it for 75 cents. To this the company reply, that all depends on how many of the new tools can be sold. A brisk demand has sprung up already; and it seems likely that carpenters, amateurs and others will buy "Odd Jobs," though they may already own a kit of the separate tools so ingeniously combined in this.

Trade Topics.

The following communication from an enterprising and well known Iowa Hardware house calls attention to the question as to the propriety of charges for box and cartage, and suggests that we open our columns for a discussion of the subject for the purpose of giving retailers an opportunity to express their views, and unite if may be in a protest which will settle the matter. In laying the communication of our esteemed correspondents before our readers we desire to say that we shall be glad to have a thorough discussion of the subject, but in the interest of fair play shall hope to hear from both sides. A full discussion of the question, bringing out the facts in the case, such as the usage of the trade in the matter, the proportion such charges bear to the value of the

goods, whether they more than cover the cost to the shipper of boxes and cartage, and whether or not the retailer in turn realizes anything from the sale of the packages, and such other points, will contribute to the solution of this vexed question. If there are serious difficulties in the way of jobbers and manufacturers acting on the suggestion of our correspondents and including the cost of case and cartage in the prices of goods, we hope this will be pointed out.

We would like to have you open your columns to the retail Hardware dealers from all parts of the country and they in return will all respond on the subject of "Box and Cartage," items which are invariably attached to each and every bill from a jobber, and which in most instances amount to as much or more than the "cash discount" on the bill, and in many cases to 4 or 5 per cent. of the bill. We know the retailers will all let themselves be heard from, and when they have done so we earnestly hope the jobbers will consider the matter. If the jobbers cannot afford to furnish the boxes and teams for conducting their business, then let them add this cost to the cost of the goods, and collect it in an indirect way and not have such items as B. & C. 50¢, B. & C. \$2.60, &c., &c., or Boxes 30, 35, 35, 40, 35, 35. Cartage, 50; Total \$2.60, staring the retailer in the face. Suppose the retailers were to notify a customer after he had purchased a bill of \$4 or \$5 worth of goods that he must pay an additional 10 cents to cover drayage from the depot, wrapping paper, twine, &c., would he get much trade? Why no! That customer would rather go to another store where that amount was figured in with the price and pay 10 cents more for his goods, and not have that infernal charge staring him in the face. Many of the jobbers do not charge for boxing and carting any more, while others are ready to abolish the practice as soon as they can make it unanimous. Now, it only remains for the retailer to make a firm stand, and absolutely refuse to pay it. Come now, brother retailer, join in, let us hear from all of you, and with our united effort we can probably wipe out this yearly expense of from 1 to 5 per cent. of our business.

From Packard & Co., Greenville, Pa., we have the following suggestion in regard to the marking of goods in shipping, which will commend itself to the approval of our readers. The annoyance to which they refer is so easily corrected that it is to be hoped that their suggestion will be acted upon:

We recommend strongly that all shippers of Hardware which is boxed put on the lid plainly

From.....
We are constantly annoyed by a drayload of goods coming in from half a dozen different shippers, which we are unable to distribute in our store and warehouse until opened and the contents revealed. The above precaution would simplify this matter greatly.

In regard to the manner of putting up Hardware in boxes we have the following suggestions from a Pennsylvania Hardware house:

1. Adapt the boxes to the quantities that are best suited to the requirements of the retail trade.
2. Boxes should be made with the strength required for the goods which they contain.
3. All boxes should have the numbers on the labels quite large, so that they may be readily seen in a dark room.

All Hardwaremen are constantly annoyed by neglect of the above essentials in Hardware packages. One-fourth of all goods received arrive in damaged or destroyed boxes.

We lay before our readers the following report of the Louisville Hardware market, which comes to us under date of July 27:

The Hardware business of Louisville, Ky., continues to improve and expand in volume, with no upward movement in prices. There is no trouble in selling wares; they go out fast enough; but the question uppermost with each dealer is whether any profits are realized. There is no doubt about it, some lines of goods are being handled on too small a margin. For instance, take the one article of Cut Nails. Where the wholesale Grocery houses handle nearly as many, in the aggregate, as the Hardware trade, they are used by them as a "go" or leader, frequently being advertised at actual cost, simply to draw the country custom. Some Hardware jobbing houses give instructions to their salesmen to throw Nails in at any price, just so the orders average up well. Speaking further on Nails, just as the trade was settling satisfactorily down to last cut price of \$1.85, delivered, a sudden rupture between the Pittsburgh and Wheeling packets causes a new cut of 2½ cents per keg in freight, making price of \$1.85½ delivered in carload lots of 240 kegs. This may be temporary, however. Dealers who usually buy heavily on the summer rise in the Ohio River for the fall trade are still a little dubious, for fear another unseen factor may cause another cut. Considerable sympathy is, for once, being expressed by the jobbers for the manufacturers in several lines, for, although the mills' statements, so often urged as inducements to buy, of "selling below costs," &c., are not given much credence to, yet there must be a limit to even ductility.

The consumers want cheap goods—providing the quality is up to standard—as the tendency is to make use of more labor-saving devices; yet even they are satisfied with present prices. The jobbers are anxious for some signs of an advance, and it does seem time for the manufacturers, individually, to call a halt and demand a fair return for money invested in plants.

The Union Indurated Fibre Company,

37 Barclay street, New York, under date July 20, issue the following schedule of prices, which are designated as jobbers' lowest selling prices for their line of Indurated Fibre ware. Terms net cash 30 days, or 2 per cent. discount for cash in 10 days, f.o.b. cars at factory, or delivered at the New York or Chicago warehouses:

	No. pos.	Per
	per	doz.
Pails, Ladies' or Weaver's 6 qt.	1 doz.	\$4.00
" Buggy or Half, 6 qt.	1 " "	4.00
" Star (standard, plain) 12 qt.	1 " "	4.50
" " stenciled "For Fire	1 " "	4.50
Only, " "	1 " "	4.50
Pails, Deck or Mason's, heavy wire	1 " "	5.00
ball, 12 qt.	1 " "	5.50
Pails, Railroad or Fire, plain, 14 qt.	1 " "	5.50
" " stenciled "For	1 " "	5.50
Fire Only, " 14 qt.	1 " "	5.50
Pails, Fire, round bottom.	1 " "	5.50
" Milk or Dairy.	1 " "	5.50
" Stable, flush bottom, 14 qt.	1 " "	5.50
" " " 16 qt.	1 " "	6.00
" " " 18 qt.	1 " "	8.00
" " " 20 qt.	1 " "	9.00
Covers for Star or Railroad Pails.	1 " "	2.50
Wash Tubs, No. 0, 23 in.	1 " "	18.50
" No. 1, 21 in.	1 " "	17.50
" No. 2, 19½ in.	1 " "	15.50
" No. 3, 18½ in.	1 " "	13.50
" No. 0 nest, 4 tubs, Nos.	1 " "	16.50
0, 1, 2 and 3 (1 nest).	1 " "	15.50
Wash Tubs, No. 1 nest, 3 tubs, Nos.	1 " "	12.00
1, 2 and 3 (2 nests).	1 " "	11.00
Keelers, No. A, 20 in.	1 " "	10.00
" No. B, 19 in.	1 " "	9.00
" No. 1, 17½ in.	1 " "	8.00
" No. 2, 15½ in.	1 " "	7.00
" No. 3, 13½ in.	1 " "	6.50
" No. 4, 12 in.	1 " "	6.00
" Nos. 1, 2, 3 and 4, nested (3	1 " "	8.50
nests).	1 " "	3.00
Milk Pans, 10 qt.	1 " "	3.00
Wash Basins, No. 1, 13½ in.	1 " "	2.50
" No. 2, 12½ in.	1 " "	2.25
" No. 3, 11½ in.	1 " "	2.00
" No. 4, 10½ in.	1 " "	2.00
With rings 10 cts. per doz. extra.	1 " "	3.00
Bread Bowls, 13 in.	1 " "	4.50
" 15 in.	1 " "	6.00
" 17 in.	1 " "	9.00
" 19 in.	1 " "	12.00
" 21 in.	1 " "	12.00
" assorted, 15, 17, 19 in.	1 " "	6.50
(4 nests).	1 " "	3.50
Handy Dishes, No. 1, 8 qt.	1 " "	3.00
" No. 2, 6 qt.	1 " "	2.50
" No. 3, 4 qt.	1 " "	2.50
With one ring or two handles, 25	1 " "	cents per dozen extra.

Vinegar Measures, 2 qt.	1/2	"	12.00
" " 1 qt.	1/2	"	10.00
" " Pint.	1/2	"	9.00
" " Funnel.	1/2	"	5.00
" " Set, 4 pcs (1 set).	1/2	"	8.00
Dry Measures, Half Bushel	1/2	"	12.00
" " Peck	1/2	"	7.00
" " Half Peck	1/2	"	5.00
" " Two Quart.	1	"	4.00
" " Quart	1	"	2.50
" " Nested, 5 pcs (4 nests)	1	"	8.00
Spittoons, No. 0, 16 in.	1/2	"	13.00
" " No. 1, 13 in.	1	"	10.00
" " No. 2, 12 in.	1	"	6.50
" " No. 3, 9 1/2 in.	1	"	6.00
Slop Jars, No. 0, 5 gal.	1/2	"	13.50
" " No. 1, 4 gal.	1/2	"	12.00
" " No. 2, 3 gal.	1/2	"	9.00
Chamber Pails, 3 gal.	1/2	"	12.00
Hotel Knife Dishes, Style A	1	"	7.50
" " " B	1	"	4.00
Champagne Coolers, with Bail or rings as desired; with bail sent unless specified.	1/2	"	9.00
Champagne Coolers, see "Mosaic Inlay"			
Oval Keelers, No. 3.	1/2	"	21.00
Water Coolers (crated singly).		Per doz.	\$24.00
3 gal.			30.00
4 gal.			30.00
5 gal.			33.00
6 gal.			36.00
3 gal., with Base.			30.00
4 gal.			37.00
5 gal.			41.00
6 gal.			44.00
3 gal., "Mosaic Inlay," Dec.			36.00
4 gal.			42.00
5 gal.			45.00
6 gal.			50.00
Umbrella Stands (crated singly).			
Full finish, plain, 9 in. diam., 23 in. deep..			20.00
Full " " 9 " 23 "			24.00
Full " dec., 9 " 23 "			27.00
Waste Paper Jars (1/4 doz. in crates).			
No. 1, plain, 10 in. diam., 12 in. deep.....			9.00
No. 2, " " 9 " 12 "			7.50
"Pa-Crusta" Decoration.			
Waste Paper Jars (1/4 doz in crate).			
No. 1, 10 in diam., 12 in. deep			\$17.00
No. 2, 9 " 12 "			15.50
Umbrella Stand, 9 in. diam., 23 in. deep, crated singly			36.00
"Mosaic Inlay" Decoration.			
Champagne Coolers (1/4 doz. in crate)			\$30.00
Umbrella Stands, 9 in. diam., 23 in. deep.			
Style No. 50, Plain Mahogany			30.00
" " No. 75, Ebony or Rosewood			33.00
" " No. 100, Ash or Walnut, with panels and Japanese.			36.00
Waste Paper Jars, No. 1, 10 in. diam., 12 in. deep.			
Style No. 20, Plain Mahogany			13.50
" " No. 25, Two Patterns, Oak			15.00
" " No. 40, Japanese or Vine Pattern			17.00
Waste Paper Jars, No. 2, 9 in. diam., 12 in. deep.			
Style No. 20			12.00
" " No. 25 - Same as No. 1. {			13.50
" " No. 40 {			15.50
Round Bottom Fire Pails set in shelves.			
1 doz. pails with shelves, brackets and screws for benches of 2 pails each.....			10.00
1 doz. pails with shelves, brackets and screws for benches of 3 pails each.....			9.00
1 doz. pails with shelves, brackets and screws for benches of 4 pails each.....			8.50

Combinations in England.

In connection with the announcement of a combination formed by the Coffin Furniture manufacturers of England, in which it is stated that the different manufacturers surrendered their separate existences in order to merge them into one large company, the London *Ironmonger* refers to the fact that in these days the favorite remedy for excessive competition and resulting low prices is some agreement among manufacturers to restrict production or to regulate prices. In this instance, however, the pooling is referred to as going beyond these ordinary methods, and so completely has it been carried into effect that the promoters of the enterprise state that the accomplishment of their plans leaves no outstanding competitor. Referring to the matter the *Ironmonger* remarks editorially :

From the point of view of the promoters of the company, therefore, everything is exactly as it should be. All competition is thoroughly extinguished, the interests of all concerned are identical, instead of being at variance, and all the makers will work for the good of their company instead of "slaughtering" prices and cutting each other's business throats by fierce competition. Thus, like the traditional conclusion of a play, "all ends happily." That being so, it is, perhaps, scarcely the right time to suggest that there may be "rifts within the lute" before long. For the moment the company enjoys a monopoly, and, in appealing to the public for capital, is at special pains to prove that that monopoly is a very profitable

one. Unless human nature is very different from what we have always found it to be, we take it for granted that the new company will not long be free from competition. Its very constitution will invite rivalry, and its acknowledged profits may have the effect of making that rivalry formidable. We do not for a moment deny that the directors and the firms who have assented to the amalgamation know their business better than any outsider, yet we are certain that they must have competition. When their competitors arise the company will doubtless endeavor to crush them by lowering prices and other devices usual under similar circumstances. In this the company may succeed—or may fail if the competition is started by strong firms—but it will be at some expense to itself. The process of manufacture is not very intricate or one which needs much capital—hence there is every inducement for firms with capital and connections to go into the business. We express this opinion in no spirit of hostility to the company, of course, but merely because we are by no means convinced of the wisdom, or the advantage to the trade, of the combination. The company will be best judged by their course of action, how ever, and for that we shall have to wait.

Mineral Product of the United States in 1887.

Dr. David T. Day, Chief of the Division of the Mining Statistics, has submitted to the Director of the United States Geological Survey a summary statement of the mineral product of the United States in 1887, in advance of the official report "Mineral Resources of the United States, 1887." The total value of the mineral products is \$538,056,345; it shows a wonderful gain over 1886, and is \$100,000,000 greater than the output of 1885. The United States lead the world in the production of minerals. The principal gains in 1887 were in the production of metallic ores and the fuels necessary for smelting them. The production of pig iron alone increased more than \$26,000,000; the high price of copper caused notable expansion in that industry. The product of coal is the largest ever recorded. Taken as a whole, the report shows a year of great prosperity for the mining industry. The great total value of more than \$500,000,000, the report says, resulted not only from an increase in the quantity of minerals mined, but also from a general advance in the prices of metals. It may be several years before this total is exceeded, and the year 1888 will fall considerably below it. Among many reasons for the decrease this year is the decline in railroad building. The principal items of interest concerning each product follow:

IRON. The principal statistics for 1887 were: Domestic iron ore consumed, about 11,300,000 long tons, value at mines, \$33,900,000. This is an increase over 1886 of 1,300,000 tons in quantity and \$5,900,000 in value. Imported iron ore consumed, 1,194,301 long tons; total iron ore consumed in 1887, about 12,494,301 long tons, or 1,454,868 tons more than in 1886. Pig iron made 6,417,148 long tons; value at furnace, \$121,925,800. This is an increase over 1886 of 733,819 tons in quantity and \$20,730,040 in value. Steel of all kinds produced, 3,389,071 long tons, an increase of 776,569 tons over 1886; value at works, \$103,811,000. Total spot value of all iron and steel in the first stage of manufacture, excluding all duplications, \$171,103,000, an increase of \$28,603,000 as compared with 1886. Limestone used as flux in the manufacture of pig iron in 1887, about 5,377,000 long tons; value at quarry, about \$3,226,200.

GOLD AND SILVER.—The total value of gold produced in 1887, according to the mint authorities, was \$33,100,000, a decrease of \$1,900,000 from 1886. Silver increased from \$51,000,000 in 1886 to \$53,441,300 (coining value) in 1887.

COPPER.—Total production 184,670,524 pounds, of which 3,750,000 pounds were made from imported pyrites. The total value was \$21,052,440, at an average of 11.4 cents per pound. The estimated total consumption of copper in the United States increased by about 14 per cent.

LEAD.—The production of lead was 160,700 short tons, valued at \$14,463,000 at \$90 per short ton. The heavy increase of "desilverized" lead from 114,829 short tons in 1886 to 135,552 in 1887 was probably due to the importation of Mexican lode silver ores. The large product of non-argentiferous lead, 25,148 short tons, is due chiefly to the development of the St. Joseph district in Missouri. The production of white lead and the several oxides from pig lead increased to a total of about 75,000 short tons.

ZINC.—The producers' returns show an increase from 42,641 short tons in 1886 to 50,140 in 1887. The price increased to 4½ cents per pound, making the total value in 1887, \$4,782,380. The production of zinc oxide was practically steady at 18,000 short tons, valued at \$1,440,000.

QUICKSILVER.—Production and value increased from 29,981 flasks, valued at \$1,060,000, to 33,825 flasks, valued at \$1,429,000. Except 65 flasks from Oregon, the total supply came from California. The price in 1887 varied from \$36.50 to \$48 per flask in San Francisco.

ANTIMONY.—The production, all in California, was 75 tons, valued \$15,300—double the production of 1886.

ALUMINUM.—The production of aluminum bronze containing 10 per cent. of aluminum increased to 144,764 pounds in 1887, valued at \$57,905. Other alloys, principally of iron and aluminum, amounted to 42,617 pounds, worth \$17,000. This shows a great demand for these alloys, for it is more than double the product of 1886.

PLATINUM.—Considerable search by dealers produced 448 ounces of crude platinum, valued at \$1838. Part of this came from British Columbia. This is more than has been produced in all previous years taken together.

COAL.—The total output of the mines, including colliery consumption, was: Pennsylvania anthracite, 37,578,747 long tons (increase over 1886, 2,725,670 long tons), or 42,088,197 short tons (increase, 3,052,751 short tons); all other coals, 87,837,860 short tons (increase, 14,129,403 tons); making the total output of all coals from mines in the United States, exclusive of slack coal thrown on the dumps, 129,925,557 short tons (increase, 17,182,154 tons); valued as follows: Anthracite, \$84,552,181 (increase, \$8,433,061); bituminous, \$97,939,656 (increase, \$19,458,600); total value, \$182,491,837 (increase, \$27,891,661). The above figures show a notable increase in 1887 over 1886 in the aggregate output and value of both anthracite and bituminous coal.

COKE.—The total production of coke in the United States for the year ending December 31, 1887, was 7,357,487 short tons, valued at \$15,725,574. This is the greatest product ever reached in the United States, being 1,022,419 tons greater than in 1886.

NATURAL GAS.—The production of natural gas in the United States in 1887 was equivalent to 9,055,000 short tons of coal displaced, value \$13,582,500. In 1886 the corresponding quantity was 6,353,000 tons, worth \$9,847,150.

BUILDING STONE.—Direct returns from producers show a total value of \$25,000,000. This marked increase of \$6,000,000 shows that the statement for 1886 was too small.

BRICK AND TILE.—Value \$40,000,000. This represents an increase of about 13 per cent. in the production of brick and a de-

crease in tile, owing to the drouth in 1887 in Indiana and Ohio. Prices were slightly lower.

LIME.—The production is estimated at 46,750,000 barrels, with an average value of 50 cents per barrel, an increase for the year of 10 per cent.

CEMENT.—The production of cement from natural rock was 6,692,744 barrels, valued at 77½ cents per barrel, making \$5,186,877 as the value of the year's product; increase, \$1,196,877.

PRECIOUS STONES.—The value of American gems in the rough state amounted to \$88,600, besides gold quartz for specimens and gems, valued at \$75,000.

SALT.—Production in 1887, 7,831,962 barrels (of 280 pounds); value, \$4,093,846. The annual production has increased each year since 1883, but the total value has declined, being less in 1887 than in 1884, although only 6,514,937 barrels were made in that year.

BORAX.—Production, 11,000,000 pounds, all from California and Nevada. Total value, \$550,000, at 5 cents per pound for the average grade. The price was rising at the close of 1887.

PYRITES.—Production, 54,500 long tons, valued at \$210,000, at \$46 per ton at the mines.

MINERAL WATERS.—The product which was sold amounted to 8,259,609 gallons, worth \$1,261,473, a slight decrease.

A New Steam Engine Packing.—A new kind of asbestos packing is now being introduced in England, which differs from the ordinary packing in having metal tubes made of a lead alloy running through the center. These tubes impart more strength to the packing than when it is made of asbestos fiber alone. Lead wires have before now been used, to make up for the somewhat brittle nature of the asbestos fiber; but the extra weight of these has been found somewhat objectionable. Tubes are now adopted in preference to solid lead cores, because of their smaller weight. The body of the packing is of asbestos yarn, plaited around the tubes by special machinery, which at the same time threads asbestos fiber through the tubes. The object of filling the tubes with asbestos fiber is that in the event of excessive heating and melting out of the tubes there shall still be a serviceable packing left. Asbestos, when saturated with steam, expands considerably, and the expansion of the inside and outside fibers would fill the space vacated by the metal. The number of tubes varies with the diameter of the packing; an asbestos rope 1 inch diameter has six tubes of $\frac{1}{8}$ inch external diameter inserted. For smaller packings five or four tubes only are used. The packing is being brought out by Messrs. John Bell & Sons, 118 Southwark street, London, S. E.

A Boston paper states: It is gossip that the French syndicate and the copper companies are more likely to renew their contracts for six years at the expiration of the three-year contracts than to break with one another before the present contracts expire. Such gossip is rather faith or opinion than anything else. The present contract runs through 1890, and many things may happen in 29 months.

An English firm, Messrs. Marshall & Co., of Keighley, have brought out what is in a measure a novelty in the engine line, being a triple expansion engine of the semi-portable type. It is of the "underneath" design, with steam-jacketed cylinders, 5½, 9 and 15½ inches in diameter, with 14-inch stroke. The high-pressure cylinder is fitted with automatic cut-off gear. The boiler is of the locomotive pattern. We understand that on trial exceedingly economical results have been obtained with the engine.

The Effect of the Chicago Waterway on Lake Michigan.

The proposed establishment of a navigable waterway between Lake Michigan and the Mississippi River has excited the apprehension of publicists, who fear that the level of the lake would be disturbed, with possibly serious consequences to important navigation interests. At first blush it would seem to be impossible to tap the lake with an outlet taking away 600,000 cubic feet per minute as proposed without affecting the supply of water, enormous as it is. But ex-Senator Doolittle allays all fear on this ground in a recent communication to Senator Sherman which is of general interest. He says that as Lake Michigan and Lake Huron (which latter receives the waters of Lake Superior also) are connected by straits at Mackinaw which are at least three miles wide and have an average depth of more than 100 feet the level of Lake Michigan could not be lowered without lowering the level of Lake Huron. But the Detroit River is the present outlet of Lake Huron, with a width at its narrowest part of 2200 feet and an average depth of 23 feet. The proposed waterway would divert part of this flow to the Mississippi, and it is calculated that 600,000 cubic feet per minute thus diverted would not diminish the flow at Detroit more than one in twenty, or so slight a diminution as to be scarcely perceptible. It would, however, slightly reduce the flow at Detroit rather than cut down the level of Lake Michigan. As to the effect on the Mississippi, Mr. Doolittle says: "It is undoubtedly true that such a flow of water added to the volume of the Mississippi below the mouth of the Illinois, would in times of low water deepen the channel over all the bars a foot or more, and thus improve the navigation of the lower Mississippi more than any other possible improvement. And, as it seems to me, it is equally true that such a waterway between the great lakes and great rivers of the United States would do as much to cheapen and regulate the rates of heavy transportation between the lakes and navigable rivers east of the Rocky Mountains as the Erie Canal now does between the Lakes and the Atlantic seaboard."

A Sheet-Iron Belt.—In the recently issued third edition of Mr. John H. Cooper's book on "The Use of Belting," Mr. John Spiers, of Worcester, Mass., gives the following account of a sheet-iron belt: "A lathe used for turning rolling-mill rolls, compound geared, has a 48-inch pulley. This is driven by an 18-inch pulley on the countershaft, which makes 120 revolutions per minute and is 8 feet from the 48-inch pulley, measured from center to center. Both pulleys are of iron, smoothly turned on the faces. A 7-inch double leather belt was used on these pulleys, but would slip when the turning tool became dull. This belt was replaced by one made of Russia sheet iron, the same as that used for stove-pipes and parlor stoves, and was riveted together in the ordinary way. It was 7 inches wide and 2 inches longer than the leather belt, the extra length making up for the want of elasticity in the iron. During one year's steady run this iron belt could not be slipped even when a heavy cut on a 25-inch roll was taken, which broke a Sanderson steel tool having a section of 2 x 2½ inches, a cutting surface, of 2½ inches, a feed of ¼-inch per revolution and an overhang of 4 inches.

The engineer on the New York Water Works devised an ingenious method for getting through quicksands at the Quaker Bridge dam. In sinking a diamond drill

for the purpose of ascertaining the geological formation a quicksand was encountered which barred further progress. To overcome the difficulty the drill was withdrawn and a very liquid cement poured into the hole. This found its way through the sand, and when set formed a solid column resting on the rock below the quicksand. A second hole driven through this cement pillar passed the troublesome stratum without difficulty.

Power Distribution in Mills.

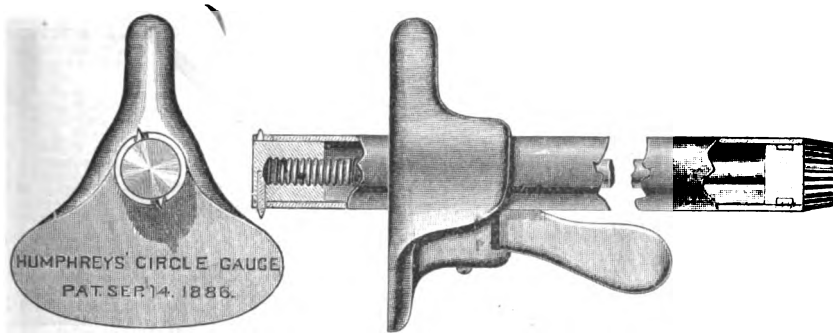
In a recent lecture on "The Evolution of the Modern Mill" delivered at Sibley College Mr. C. J. H. Woodbury remarked that the early form of distribution of power consisted in placing a vertical shaft extending through the whole mill and distributing the power at each story by means of beveled gears, generally of skewed-beveled form. The mechanical defects of such a method of distributing power, with regard to protection, repairs and necessary care, are readily apparent, and there have also been many severe accidents caused by the breaking of teeth in these gears. The present method of distributing power in this country is entirely by lines of belts extending up through what is known as a belt tower, which constitutes an element of great fire hazard to a mill. In some cases the belts are carried from story to story, covered by a casing of wood, and in other instances the tower forms a flue which may be the means of the rapid spread of fire throughout the building.

It would be impossible to arrange the distribution of power in many mills to conform to conditions of safety without reorganizing the whole plant, which would of course be impracticable. But in many instances modifications can be introduced which will diminish the hazard to a great degree. When the pulleys and belting are covered with sheathing in each room the continuity of these flues can be broken by removing this sheathing down to the height of 4 or 5 feet above the floor, so that the covering will merely constitute a physical protection to any one approaching the belting. The best method of arranging the belt tower has been in the case of a mill at Fall River, which was erected upon the ruins of a building destroyed by a fire originating in the belt tower. The machinery is driven by a steam engine situated in an ell projecting from one side at about the middle of the mill, and the main belt communicates to pulleys in a stone masonry tower located directly inside the walls of the main mill, and thence, from pulley to pulley, the power is communicated to each floor by shafting passing through holes left in the tower, and in no instances by means of belts. There is a separate stairway inside of the tower for lubricating the journals, &c., and the top of the tower is covered with skylights protected underneath by a wire netting. In case of a fire in the belt tower the heat will readily break the glass at the top, and the fire will tend to go up and out of the tower rather than through the mill.

According to the *English Mechanic* a black coating for brass objects is made by dissolving 1.05 ounces of carbonate of copper, while being well stirred, in 8.80 ounces of spirits of ammoniac, 17.60 ounces of water being added to the solution. The brass objects should have been well polished with emery paper, and are fastened to brass or copper wires. They are plunged for a short time in the solution, and when completely blackened are rinsed in water. They are then dried in sawdust, and finally rubbed with oil varnish diluted with oil of turpentine. This black coating is said to be durable, and to stand exposure in the open air.

Humphrey's Circle Gauge.

The cut given below represents one of an interesting series of tools which are made by the Humphrey Tool Company, Warren, Mass. This gauge is intended for use in all kinds of wood or metal working where a scratch line is required on straight or curved edges. Its construction is shown in some detail in the illustration, which represents it full size except

*Humphrey's Circle Gauge.*

in length. As there indicated, it will be seen that the head is held in place by a lever, the operation of which is simple and efficient. The marking tooth, which is made of hardened steel passes through the bar, and emphasis is laid on the fact that the opposite points are always the same distance from the flat face of the gauge on the one side, and from the post on the other, thus making it easy to run a parallel line with the straight edge of the work, and by reversing the tool continue the line around all the curves. A fine adjustment is secured by means of the adjusting screw at the end of the bar. The simplicity and efficiency of this tool, the excellence of the workmanship and finish, and its comparative inexpensiveness, are points which are made in regard to it by the company. For the manufacture of this and other tools the company advise us that their factory is furnished with the most approved machinery, and first-class workmen are employed, so that they refer with confidence to the excellence of their manufactures.

Cline's Fire-Proof Cooker.

We show in the accompanying engraving a form of cooking apparatus recently brought out by the Cline Mfg. Company, of 70 and 72 West Washington street, Chicago, Ill. The engraving represents the device placed in position upon the stove and having the outer casing broken away, showing the internal arrange-

*Cline's Fire-Proof Cooker.*

ment of parts. The device is made with a vessel of tin supported by an enveloping shield of galvanized iron. The bottom of the cooker is $\frac{1}{4}$ inch from the stove, which allows a circulation of hot air beneath and around the inner vessel of cooker. This arrangement of parts, the manufacturers claim, prevents the food contained

in the vessel from burning. It is made in sizes having a capacity of 2, 3 and 4 quarts, and is adapted for use upon any stove.

Champion Campaign Torch.

The Postal Package Company, 34 South Paca street, Baltimore, Md., are putting on the market the Champion Campaign Torch herewith illustrated. It is made of tin on

*Champion Campaign Torch.*

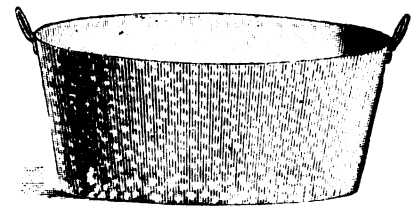
washer which rests on the flange of the can, and on which the top is seated when screwed down, rendering the torches; it is claimed, absolutely oil-proof. It will be observed that the burner is provided with a drip cup, to avoid soiling the clothes of those carrying the torches. The point is also made that this torch can be filled with exceptional rapidity. It is stated to have a capacity sufficient to burn four hours. Besides being admirably adapted as a campaign torch, it is also referred to as suitable for engineers, firemen, railroad men and others working about machinery.

According to *La Nature* blue prints may be given the black tone by plunging them into a solution of 4 parts of potash

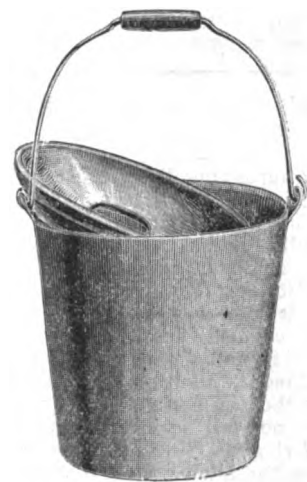
in 100 parts of water, then when the blue color has entirely disappeared under the action of the potash, and a yellowish color has taken its place, they are immersed in a solution of four parts of tannin, also in 100 parts of water; then washing them again we obtain prints whose tone may be assimilated to that of pale writing ink.

New Indurated Fibreware.

The Union Indurated Fibre Company, 37 Barclay street, New York, are offering as new lines Oval Keelers shown in Fig. 1, which are referred to as serviceable for foot-baths, dish-pans, &c. Another addition to their house-furnishing line is shown in Fig. 2. These chamber pails are, it will be observed, a different shape from their slop jars. They are described as

*Fig. 1.—Oval Keeler.*

superior to tin or galvanized iron in being inodorous, and as cheaper in the end, while as compared with earthenware they are not liable to breakage. The company have also added to their line of stable buckets 18 and 20 quart sizes, as they have had calls for these large buckets. They are described as of approved pattern and suited for heavy work. The champagne cooler which they have lately offered in their regular finish, they are now furnishing in their mosaic inlay decoration, a finish to the attractiveness of which they allude. Their lines of measures are now complete, and are offered in the regular nests of five, including quart and 2-quart. The demand for these measures, both wet and dry, has exceeded the ex-

*Fig. 2.—Chamber Pail.*

pectations of the company, and customers are obliged to wait their turn in the filing of orders. The demand will, however, soon be met, as additional machinery for turning out these goods is being rapidly put in operation.

Buffalo has begun to take prominence as an ore receiving and shipping port. A new ore dock, the Minnesota, was recently opened there, and the old docks are still undergoing improvements. Contracts have been closed for the construction and equip-

ment of a large dock on the Blackwell Canal, to be used for receiving iron ore from lake vessels. H. K. Wick, of Youngstown, Ohio, who is largely interested in coal and iron ore at Ohio ports, is at the head of the scheme. Room will be had for the storage of 100,000 tons of ore. The contracts call for the completion of 400 feet of dockage, with hoisting apparatus, railway tracks and switches by August 9. Four Brown hoists, which will have the capacity to take out 1000 tons of ore a day, will first be erected. Later two others will be added, giving the dock facilities for the unloading of 1500 tons daily.

New Package for Liquid Glue.

The Le Page Glue and Cement Company, Gloucester, Mass., are putting up W. N. Le Page's improved glue in a new style of can, which is represented in the accompanying illustration. The special feature of this can is the fact that the cover is not screwed on, but fits snugly and is held in place by a brace or catch, as



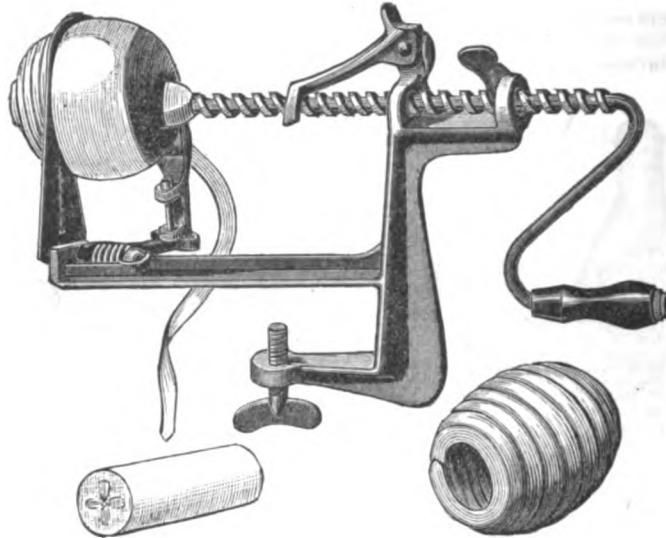
W. N. LePage's Liquid Glue.

shown in the cut. The brush is inserted, as indicated, through the top of the cover, in the usual manner.

Hudson's New '88 Apple Parer, Corer and Slicer.

The accompanying illustration represents this machine, which is manufactured by C. E. Hudson, Leominster, Mass. It is of a similar design to the Little Star, manufactured by the same house, and is alluded to as doing excellent work, although it does not possess all the advantages claimed for the Little Star, which the manufacturer regards as of exceptional merit, referring especially to the fact that the parings and juice from the apple do not fall upon the machine to gum and clog it. The New '88 is a cheaper parer than the Little Star, and is designed for a class of trade calling for low-priced goods, and is put on the market more particularly to meet cheaper machines offered by other manufacturers. The simplicity of the construction of this machine is emphasized, while it is claimed that its work is exceptionally satisfactorily performed. It pares, cores and slices the apple, and pushes the core from the fork. The edge of the paring knife is not made round, as has heretofore been done, and consequently it does not gouge into the apple, taking off more of the fruit than the skin. This new slicing and coring knife is described as so arranged that the fruit is less liable to be broken from the fork than in other parers.

The slicing knife is made of one piece of steel. The machine has a steel crank shaft and screw-tinned cast-steel slicing knives and crankshaft, and other novel features. It is claimed that it will operate on larger and softer fruit than other parers, and is alluded to in tastiness of appearance,

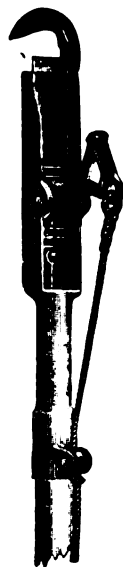


Hudson's New '88 Parer, Corer and Slicer.

finish, durability and good work as having advantages over other parers of its class.

Electric Patent Pruner.

The Mechanics Mfg. Company, New Bedford, Mass., are putting on the market a new pruner, which they have named the Electric. It is represented in the illustration herewith given, which shows quite clearly its special features. It will be seen that the chisel or cutting knife has a rack, which gears into a toothed segment, which is operated by a lever or arm which is cast as a part of it. To this the cord is attached, passing down to the person using the pruner. The efficiency of this implement and its convenience in use will be appreciated by the trade. These pruners are made in two sizes. No. 1, 10½ inches



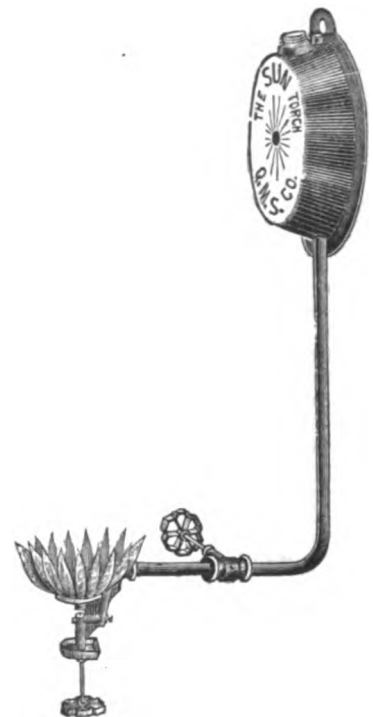
The Electric Patent Pruner.

in length, 1½ inches wide; weight, 17½ ounces. It is intended for cutting branches up to ½ inch in diameter. The larger size, No. 2, is 12 inches long, 1½ inches wide and weighs 27 ounces. It will cut branches ¾ inch in diameter. With each pruner is included a line and ball handle for the same, the whole being neatly packed in a wooden box with sliding cover.

The Quick Meal Torch.

The Ringen Stove Company, of St. Louis, Mo., are directing the attention of the trade to their Quick Meal gasoline torch, a general view of which is shown in the engraving presented herewith. This

torch is of simple construction, and represents the results of several years' careful consideration of the requirements of the trade in this direction. The general arrangement of the parts is clearly indicated in the engraving, which shows the torch with the burner lighted. The reser-



The Quick Meal Gasoline Torch.

voir has a capacity of 5 quarts. The flame is claimed to be bright, clear and full, and will not blow out in the strongest wind. The makers claim that the flame given by this torch is larger than that of any similar construction. The torch is especially adapted for foundries, markets, shops, and also in places where it is exposed to the weather. The company propose to push it, and endeavor to make it as well known as the Quick Meal cooking stove.

CURRENT HARDWARE PRICES.

AUGUST 1, 1888.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers' name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers at the figures named.

Ammunition.

Case, Perfection, 7-1000- Slicks & Goldmark's	
F. L. Waterproof, 1-10's	50¢
E. B. Trimmed Edge, 1-10's	55¢
B. B. Ground Edge Central Fire, 1-10's	70¢
Double Waterproof, 1-10's	74¢
Musket Waterproof, 1-10's	50¢
G. D.	25¢
A. B.	30¢
Union Metallic Cartridge Co.	
F. O. Trimmed	50¢
F. L. Ground	55¢
Con. Fire Ground	70¢
Double Waterproof	74¢
Double Waterproof, in 1-10's	74¢
E. B. Genuine Imported	45¢
Wey's E. B.	54¢
Wey's D Waterproof, Central Fire	\$1.00

Cartridges.

Rem Fire Cartridges	dis 50¢52¢
Rem Fire Military	dis 15¢2¢
Central Fire Pistol and Rifle	dis 22¢52¢
Central Fire, Military & Sporting	dis 15¢52¢
Blank Cartridges, except 22 and 23 cal., an additional 10% over above discounts.	
Blank Cartridges, 22 cal.	dis 17¢52¢
Blank Cartridges, 23 cal.	dis 25¢52¢
Primed Sheets and Bullets	dis 15¢52¢
R. B. Caps, Round Ball	dis 17¢52¢
R. B. Caps, Conical Ball, Swaged	dis 20¢52¢

Primers.

Borden Primers all sizes, and B. L. Caps (for Sturtevant Shells)	dis 1.00, dis 2¢
All other Primers, all sizes	dis 1.20, dis 2¢

Shells.

First quality, 4, 8, 10 and 12 gauge, dis 25¢10¢2¢	
First quality, 14, 16 and 20 gauge, (10 list)	dis 30¢10¢2¢
Star, Club, Rival and 10 gauge, 38 list	dis 38¢
Climax Brands, 12 gauge, 38 list	dis 10 2¢
Club, Rival and Climax Brands, 14, 16 and 20 gauge	dis 30¢10¢2¢
Seibold's Combination Shot Shells	dis 15¢2¢
Brass Shot Shells, 1st quality	dis 60¢2¢
Brass Shot Shells, Club, Rival and Climax	dis 65¢2¢

Shells Loaded.

List No. 19, 1887	dis 20¢ & 10¢
Wads	
U. M. C. & W. R. A.—R. E., 11 up	\$2.00
U. M. C. & W. R. A.—R. E., 22 10	2.30
U. M. C. & W. R. A.—R. E., 28 10	2.50
U. M. C. & W. R. A.—P. E., 11 up	3.10
U. M. C. & W. R. A.—P. E., 22 10	4.00
U. M. C. & W. R. A.—P. E., 28 10	4.90
Wey's E. B., 11 up	\$1.75
Wey's P. E., 11 & 20	\$2.30

Avails.

Avails—Eagle Avails	dis 10¢, dis 20¢ & 20¢5¢
Peter Wright's	dis 10¢
Armstrong's Mouse Hole	dis 10¢
Armstrong's Mouse Hole, Extra	dis 11¢
Wickham's	dis 10¢
I. & Riley Carr. Patent Solid	dis 11¢10¢
Avail Vise and Drill	
Millers Falls Co.	dis 12.00, dis 20¢
Cheney Avail and Vise	dis 25¢
Allen Combined Avail and Vise	dis 40¢10¢
Moore & Barnes Mfg. Co.	dis 39¢4¢

Augers and Bits.

Douglas Mfg. Co.	
New Haven Copper Co.	
Wm. A. Ives Co.	dis 70¢
Summerville Mfg. Co.	
French, Swift & Co. (F. H. Beecher)	
Cook's, Douglas Mfg. Co.	dis 55¢
Cook's, New Haven Copper Co.	dis 50¢10¢50¢10¢55¢
Ives' Chromium Lip	dis 60¢
Patent Solid Head	dis 60¢
A. E. Jennings & Co., No. 10, extension lip	dis 40¢
A. E. Jennings & Co., No. 30	dis 60¢
C. E. Jennings & Co., Auger Bits, in fancy boxes	
Pat. 334 quarters, No. 5, 25; No. 30, 25	dis 20¢
Low's Patent Single Twist	dis 45¢
Russell Jennings' Augers and Bits	dis 25¢
Imitation Jennings' Bits (new list)	dis 60¢50¢
Fugh's Black	dis 20¢
Car Bits	dis 50¢10¢60¢
L. Hommedien Car Bits	dis 15¢10¢
Forester Pat. Auger Bits	dis 10¢
Hollow Augers	
Ives	dis 25¢10¢
French, Swift & Co.	dis 25¢10¢55¢
Douglas' Adjustable	dis 40¢10¢
Boomer's	dis 20¢10¢
Ives' Expansive, each \$4.50	dis 50¢10¢
Universal Expansive, each \$4.50	dis 20¢
Wood's	dis 20¢ & 25¢10¢

Expansive Bits.

Jack's small, 118; large, 205	dis 25¢ & 25¢55¢
Ives' No. 4, per doz.	dis 25¢ & 40¢
Swan's	dis 40¢
Stearns, No. 1, 225; No. 2, 225	dis 25¢
Stearns' No. 2, 245	dis 20¢

Small Bits.

Common	dis 25¢75¢ & 25¢
Diamond	dis 10¢, dis 25¢10¢
"Bee"	dis 25¢ & 25¢55¢
Double Cut, Sheppardson's	dis 45¢ & 45¢55¢
Double Cut, Ot. Valley Mfg. Co.	dis 50¢10¢
Double Cut, Hartwell's, 7 gro.	dis 25¢
Double Cut, Douglas'	dis 40¢10¢
Double Cut, Ives'	dis 60¢ & 60¢55¢

Set Screws.

Moore Twist Drills	dis 50¢10¢55¢
Standard	dis 50¢10¢55¢
Cleveland	dis 50¢10¢55¢
Syracuse, for metal	dis 50¢10¢55¢
Syracuse, for wood (wood list)	dis 50¢ & 30¢55¢
Williams' or Holt's, for metal	dis 50¢10¢10¢
Williams' or Holt's, for wood	dis 40¢10¢

Small Augers and Bits.

L. Hommedien's	dis 15¢10¢
Watrous's	dis 15¢10¢
Small's	dis 15¢10¢
Small's Ship Auger Fast's Car Bits	dis 15¢10¢

Awl Hatts.

Swing, Brass Ferrule	dis 25¢ & 25¢
Patent Sewing, Short	dis 1.00 & 1.00
Patent Sewing, Long	dis 1.20 & 1.20
Patent Peg, Plain Top	dis 1.00 & 1.00
Patent Peg, Leather Top	dis 1.20 & 1.20

Awls, Brad Sets, &c.

Awl, Sewing, Common	dis 1.70—dis 25¢
Awl, Shouldered Peg	dis 2.45—dis 40¢40¢10¢
Awl, Patent Peg	dis 2.45—dis 40¢40¢10¢
Awl, Shouldered Brad	dis 2.70 & gross—dis 35¢
Awl, Handled Brad	dis 2.75 & gross—dis 45¢
Awl, Handled Scratch	dis 2.75 & gross—dis 35¢10¢
Awl, Socket Scratch	dis 1.50 & gross—dis 35¢ & 30¢

Awl and Tool Sets.

Then's Sets, Awls & Tools, No. 20	dis 50¢10¢
Ray's Ad Tool Hds., Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	dis 1.15; 2, 1.15; 3, 1.15; 4, 1.15; 5, 1.15; 6, 1.15; 7, 1.15; 8, 1.15; 9, 1.15; 10, 1.15; 11, 1.15; 12, 1.15; 13, 1.15; 14, 1.15; 15, 1.15; 16, 1.15; 17, 1.15; 18, 1.15; 19, 1.15; 20, 1.15; 21, 1.15; 22, 1.15; 23, 1.15; 24, 1.15; 25, 1.15; 26, 1.15; 27, 1.15; 28, 1.15; 29, 1.15; 30, 1.15; 31, 1.15; 32, 1.15; 33, 1.15; 34, 1.15; 35, 1.15; 36, 1.15; 37, 1.15; 38, 1.15; 39, 1.15; 40, 1.15; 41, 1.15; 42, 1.15; 43, 1.15; 44, 1.15; 45, 1.15; 46, 1.15; 47, 1.15; 48, 1.15; 49, 1.15; 50, 1.15; 51, 1.15; 52, 1.15; 53, 1.15; 54, 1.15; 55, 1.15; 56, 1.15; 57, 1.15; 58, 1.15; 59, 1.15; 60, 1.15; 61, 1.15; 62, 1.15; 63, 1.15; 64, 1.15; 65, 1.15; 66, 1.15; 67, 1.15; 68, 1.15; 69, 1.15; 70, 1.15; 71, 1.15; 72, 1.15; 73, 1.15; 74, 1.15; 75, 1.15; 76, 1.15; 77, 1.15; 78, 1.15; 79, 1.15; 80, 1.15; 81, 1.15; 82, 1.15; 83, 1.15; 84, 1.15; 85, 1.15; 86, 1.15; 87, 1.15; 88, 1.15; 89, 1.15; 90, 1.15; 91, 1.15; 92, 1.15; 93, 1.15; 94, 1.15; 95, 1.15; 96, 1.15; 97, 1.15; 98, 1.15; 99, 1.15; 100, 1.15

Axes.

Makers' and Special Brands—	
1st quality	dis 25.00 & 25.50
2nd quality	dis 25.00 & 25.50

Axle Greases.

Fraser, in bulk	dis 7.50 & 7.50
Fraser, in boxes	dis 7.50 & 7.50
Dixon's Everlasting, in bxs	dis 1.20 & 1.20
Dixon's Everlasting, 10 lb pails, each	dis 8.00
Lower grades, special brands	dis 7.50 & 7.50

Axles.

No. 1, 4 & 4 1/2 No. 2, 5 1/2 & 5 1/2	
7 to 13	dis 50¢55¢
14 to 22	dis 50¢10¢10¢70¢
National Wrought Steel Tubular Self-Oiling	
Standard Farm (1 to 5) and Special Farm (A1 to A5)	dis 33¢4¢
Less than 10 sets	dis 33¢4¢
Over 10 sets	dis 33¢4¢
Strong Exp. (6 to 9), and XX Strong Truck (10 to 10)	dis 33¢4¢
Less than 10 sets	dis 10¢
Over 10 sets	dis 10¢55¢

Bag Holders.

Shingle's Pat., 7 doz 118	dis 60¢
Balances—Spring Balances	dis 60¢
Common 24	dis 1.50—dis 50¢
Chastillon's Spring Balances	dis 50¢
Chastillon's Circular Spring Balances	dis 60¢

Bells.

Light Brass	dis 70¢10¢
Extra Heavy	dis 60¢10¢
White Metal	dis 60¢10¢10¢
Silver Chime	dis 25¢10¢55¢
Shells (Coke's Patent)	dis 25¢10¢ & 35¢

Bells.

Gong, Abbe's	dis 25¢10¢ & 25¢
Gong, Yankee	dis 40¢10¢
Gong, Barton's	dis 40¢10¢ & 50¢
Crank, Taylor's	dis 25¢10¢
Crank, Brooks'	dis 50¢10¢55¢
Crank, Connel's	dis 25¢10¢
Lever, Sargent's	dis 60¢10¢
Lever, Taylor's Branded or Plated	dis 25¢10¢
Lever, Taylor's Japanned	dis 25¢10¢
Lever, R. E. W. Co's	dis 50¢10¢55¢
Full, Brook's	dis 50¢10¢55¢
Full, Western	dis 25¢10¢

Bells.

Common Wrought	dis 50¢10¢
Western	dis 50¢10¢
Western, Sargent's list	dis 70¢10¢
Kentucky "Star"	dis 20¢10¢
Kentucky, Gentile's list	dis 70¢10¢
Dodge, Gentile's list	dis 70¢10¢
Temple Steel	dis 50¢10¢ & 60¢10¢55¢
Call	dis 40¢10¢55¢
Farm Bells	dis 25¢ & 35¢
Steel Alloy Church and School Bells	dis 40¢
Bellows—Blacksmiths	dis 50¢10¢55¢ & 60¢
Molders	dis 40¢ & 40¢10¢
Hand Bellows	dis 40¢10¢ & 40¢

Belting, Rubber.

Common Standard	dis 70¢10¢
Standard	dis 70¢70¢ & 1
Extra	dis 60¢10¢
N. Y. & S. Co. Standard	dis 60¢
N. Y. & S. Co. Extra Standard	dis 50¢10¢
Beach Steps	
Worrell's	dis 20¢ & 20¢55¢
Hutchinson's	dis 20¢ & 20¢10¢
Weston's, per doz No. 1, 210; No. 2, 210	dis 25¢10¢55¢
McGill's	dis 25¢ & 25¢10¢

Bits.

Auger, Gimlet Bit Stock, Drills, &c., see Augers and Bits.	
Bit Holders	
Extension, Barber's	dis 15.00—dis 40¢ & 40¢10¢
Extension, Ives'	dis 20.00—dis 60¢55¢ & 60¢10¢
Diagonal	dis 25.00—dis 40¢
Angular	dis 25.00—dis 40¢55¢

Blind Adapters.

Domestic	dis 25.00—dis 25¢
Excelsior	dis 25.00—dis 60¢10¢55¢
Washburn's Self-Loading	dis 20¢ & 20¢10¢

Blind Fasteners.

Macrell's	dis 20¢ pairs, 21.00—dis 20¢50¢10¢
Van Sand's Screw Pattern	dis 15¢ & 15¢
Van Sand's Old Pattern	dis 15¢ & 15¢
Washburn's Old Pattern	dis 20¢ & 20¢
Merriman's	dis 20¢ & 20¢
Austin & Eddy No. 3008	dis 20¢ & 20¢
Security Gravity	dis 20¢ & 20¢

Blind Staples.

Barbed, 1/4 in. and larger	dis 25¢ & 25¢
Barbed, 1/2 in.	dis 25¢ & 25¢
Blocks	
Overhead Tackle, list April 17, '85	dis 40¢
Cleveland Block Co., Mal. Iron	dis 60¢
Novelty Tackle Blocks, Mal. Iron	dis 60¢

Bolts.

Door and Shutter	
Cast Iron Barrel, Square, &c.	dis 70¢ & 70¢10¢
Cast Iron Shutter Bolts	dis 70¢ & 70¢10¢
Cast Iron Chain (Sargent's list)	dis 60¢10¢
Free Patent Door Bolts	dis 60¢
Wrought Barrel	dis 70¢ & 70¢10¢
Wrought Square	dis 70¢ & 70¢10¢
Wrt Shutter, all iron, Stanley's list	dis 60¢10¢
Wrt Shutter, Brass Knob, Stanley's	dis 40¢10¢
Wrought Shutter, Sargent's list	dis 60¢10¢
Wrought Sunk Flush, Sargent's list	dis 55¢10¢
Wrought Sunk Flush, Stanley's list	dis 50¢10¢
Wrought S. K. Flush, Com'n Stanley's list	dis 50¢10¢

Carriage.

Com. list June 10, '84	dis 75¢52¢
Genuine Eagle, list Oct. '84	dis 75¢10¢
Phila. pattern, list Oct. 7, '84	dis 75¢10¢
R. B. & W. old list	dis 70¢

Stoves.

Common, list Feb. 23, 1885	dis 70¢
P. C. B. & N. Co., Empire, list Feb. 23, 1885	dis 70¢
P. C. B. & N. Co., Philadel., list Oct. '84	dis 33¢4¢
P. C. B. & N. Co., Keystone, Phil. list Oct. '84	dis 30¢
P. C. B. & N. Co., Norway, Phil. list Oct. '84	dis 75¢10¢
Am. Co., Norway, Phil. list Oct. 16, '84	dis 75¢10¢
Am. S. Co., East's, Phil. list Oct. 16, '84	dis 30¢
Am. S. Co., Philadel., list Oct. 16, '84	dis 33¢4¢
Am. S. Co., Bay State, list Feb. 23, '84	dis 70¢
R. B. & W., Philadel., list Oct. 16, 1884	dis 32¢
R. & E. Mfg. Co.	dis 70¢

Stove and Fire.

Stove	dis 63¢4¢
Plover	dis 60¢4¢
Am. S. Co. Stove, Annealed	dis 63¢4¢
R. B. & W., Plover	dis 65¢
R. B. & W., Stove	dis 63¢4¢
R. & E. Mfg. Co., Stove	dis 63¢4¢
Machine	dis 75¢10¢ & 75¢10¢55¢
Bolt Ends	dis 75¢10¢ & 75¢10¢55¢

Sewing Machines.

Without Augers, Upright, Angular	
Douglas	dis 50¢
Smith, Rice's Patent	dis 60¢10¢
Jennings	dis 60¢10¢
Other Machines	dis 2.25
Phillips' Pat., with Augers 7.00	dis 7

Ladies.
Melting, Bargent's..... dis 55&10
Melting, Reading..... dis 55&10
Melting, Monroe's Patent..... 50c
Melting, P. S. & W..... dis 55&10
Melting, Warner's..... dis 55c

Lawn Mowers.
Standard List..... dis 50&10
Enterprise..... dis 60&10

Lanterns.
Tubular, Plain, with Guards..... 50c
Tubular, Lift Wire, with Guards..... 50c
Tubular, Square Plain, with Guards..... 50c
Tubular, Sq. Lift Wire, with Guards..... 50c
Without Guards, 25¢ a dozen less.
Police, Small, 50¢; Med. 75¢; Large, 75¢. dis 50&10

Leaves Sewers.
Porcelain Lined, No. 1..... 50c
Wood, No. 2..... 50c
Wood, Common..... 50c
Dunlap's Improved..... 50c
Sammis..... No. 1, 50; 2, 50; 12, 50 50c
Sammis..... No. 1, 50; 2, 50; 12, 50 50c
The "Boss"..... 50c
Dean's..... No. 1, 50; 2, 50; 12, 50 50c
Little Giant..... 50c
King..... 50c

Lines.
Jotton and Linen Fish, Draper's..... dis 60
Oraper's Chalk..... dis 60
Oraper's Mason's Lines, 54 ft., No. 1, 51.25; No. 1, 51.75; No. 2, 52.25; No. 4, 52.75; No. 5, 53.25. dis 55
Sammis..... No. 1, 50; 2, 50; 12, 50 50c
Sammis..... No. 1, 50; 2, 50; 12, 50 50c
Silver Lake, Braided, No. 4, 50.00; No. 1, 50.50; No. 2, 51.00; No. 3, 51.50; No. 4, 52.00; No. 5, 52.50. dis 55
Mason's Lines, No. 3, 51.50; No. 4, 52; No. 5, 52.50
Mason's Colored Cotton..... dis 55
Vale's Ropes, No. 18, 53.00; No 19, 53.00; No 20, 53.50. dis 55
Vale's Ropes, No. 18, 53.00; No 19, 53.00; No 20, 53.50. dis 55
Cotton..... 50c
Locks, Padlocks, Cabinet Locks, &c.

Door Locks, Latches, &c.
List, Dec. 30, 78, chd. Feb. 2, '87..... dis 50&10
List, Dec. 30, 78, chd. Feb. 2, '87..... dis 50&10
Mallory, Wheeler Co., list, July, 1888..... dis 50&10
Sargent & Co., list Feb. 1, 1888..... dis 50&10
Reading Hardware Co., list Feb. 2, 1888..... dis 50&10
Livingston & Co..... dis 70
Perkins' Burglar Proof..... dis 60
Perkins' "Extension Cylinder"..... dis 55
Barnes Mfg. Co..... dis 50
Yale Corrugated Key..... dis 55
Diets Flat Key..... dis 50
L. & C. Round Key Latches..... dis 50
L. & C. Flat Key Latches..... dis 50
Yale Night Latches..... dis 55
Yale new list..... dis 55
"Shepardson" or "U. S."..... dis 55
"Feltner" or "American"..... dis 55
Seed's N. Y. Hasp Lock..... dis 55

Cabinets—
Bagle, Gaylord Parker and } List March, '84, revised
Corbin } Jan. 1, '85, dis 55
Delta, Nos. 36 to 39..... dis 55
Delta, Nos. 51 to 53..... dis 55
Delta, Nos. 56 to 58..... dis 55
Stoddard Lock Co..... dis 55
"Champion" Night Latches..... dis 55
Barnes Mfg. Co..... dis 55
Bagle and Corbin Trunk..... dis 55
"Champion" Cabinet and Combination..... dis 55
Yale..... dis 55
Romer's..... dis 55

Adlocks—
List, Dec. 23, '84..... dis 70
Yale Lock Mfg. Co. s..... dis 55
Eureka, Yale Lock Co..... dis 55
Romer's, Nos. 10 to 21..... dis 55
Romer's Scandinavian, &c. Nos. 100 to 505..... dis 55
A. E. Diets..... dis 55
"Champion" Padlocks..... dis 55
"Shepardson"..... dis 55
"Horse Shoe," 50c..... dis 55
Barnes Mfg. Co..... dis 55
Nock's..... dis 55
Brown's Patent..... dis 55
Scandinavian..... dis 55
Fram's Pat. Scandinavian new list (Covl.)..... dis 55

Lumber Tools.
King Peavies, "Blue Line" Finish..... 50c
King Peavies, Common Finish..... 50c
Vale Socket Peavies..... 50c
Wall, Iron Socket Peavies..... 50c
Cant Hooks, "Blue Line" Finish..... 50c
Cant Hooks, Common Finish..... 50c
"Ant Hooks, Mall. Socket Clasp, "Blue Line" Finish..... 50c
"Ant Hooks, Mall. Socket Clasp Common Finish..... 50c
"Ant Hooks, Clip Clasp, "Blue Line" Fin..... 50c
"Ant Hooks, Clip Clasp, Common Finish..... 50c
Hand Spikes..... 50c
Pike Poles, Pike & Hook, 12 ft. 14 ft. 16 ft. 18 ft. 20 ft. 22 ft. 24 ft. 26 ft. 28 ft. 30 ft. 32 ft. 34 ft. 36 ft. 38 ft. 40 ft. 42 ft. 44 ft. 46 ft. 48 ft. 50 ft. 52 ft. 54 ft. 56 ft. 58 ft. 60 ft. 62 ft. 64 ft. 66 ft. 68 ft. 70 ft. 72 ft. 74 ft. 76 ft. 78 ft. 80 ft. 82 ft. 84 ft. 86 ft. 88 ft. 90 ft. 92 ft. 94 ft. 96 ft. 98 ft. 100 ft. 102 ft. 104 ft. 106 ft. 108 ft. 110 ft. 112 ft. 114 ft. 116 ft. 118 ft. 120 ft. 122 ft. 124 ft. 126 ft. 128 ft. 130 ft. 132 ft. 134 ft. 136 ft. 138 ft. 140 ft. 142 ft. 144 ft. 146 ft. 148 ft. 150 ft. 152 ft. 154 ft. 156 ft. 158 ft. 160 ft. 162 ft. 164 ft. 166 ft. 168 ft. 170 ft. 172 ft. 174 ft. 176 ft. 178 ft. 180 ft. 182 ft. 184 ft. 186 ft. 188 ft. 190 ft. 192 ft. 194 ft. 196 ft. 198 ft. 200 ft. 202 ft. 204 ft. 206 ft. 208 ft. 210 ft. 212 ft. 214 ft. 216 ft. 218 ft. 220 ft. 222 ft. 224 ft. 226 ft. 228 ft. 230 ft. 232 ft. 234 ft. 236 ft. 238 ft. 240 ft. 242 ft. 244 ft. 246 ft. 248 ft. 250 ft. 252 ft. 254 ft. 256 ft. 258 ft. 260 ft. 262 ft. 264 ft. 266 ft. 268 ft. 270 ft. 272 ft. 274 ft. 276 ft. 278 ft. 280 ft. 282 ft. 284 ft. 286 ft. 288 ft. 290 ft. 292 ft. 294 ft. 296 ft. 298 ft. 300 ft. 302 ft. 304 ft. 306 ft. 308 ft. 310 ft. 312 ft. 314 ft. 316 ft. 318 ft. 320 ft. 322 ft. 324 ft. 326 ft. 328 ft. 330 ft. 332 ft. 334 ft. 336 ft. 338 ft. 340 ft. 342 ft. 344 ft. 346 ft. 348 ft. 350 ft. 352 ft. 354 ft. 356 ft. 358 ft. 360 ft. 362 ft. 364 ft. 366 ft. 368 ft. 370 ft. 372 ft. 374 ft. 376 ft. 378 ft. 380 ft. 382 ft. 384 ft. 386 ft. 388 ft. 390 ft. 392 ft. 394 ft. 396 ft. 398 ft. 400 ft. 402 ft. 404 ft. 406 ft. 408 ft. 410 ft. 412 ft. 414 ft. 416 ft. 418 ft. 420 ft. 422 ft. 424 ft. 426 ft. 428 ft. 430 ft. 432 ft. 434 ft. 436 ft. 438 ft. 440 ft. 442 ft. 444 ft. 446 ft. 448 ft. 450 ft. 452 ft. 454 ft. 456 ft. 458 ft. 460 ft. 462 ft. 464 ft. 466 ft. 468 ft. 470 ft. 472 ft. 474 ft. 476 ft. 478 ft. 480 ft. 482 ft. 484 ft. 486 ft. 488 ft. 490 ft. 492 ft. 494 ft. 496 ft. 498 ft. 500 ft. 502 ft. 504 ft. 506 ft. 508 ft. 510 ft. 512 ft. 514 ft. 516 ft. 518 ft. 520 ft. 522 ft. 524 ft. 526 ft. 528 ft. 530 ft. 532 ft. 534 ft. 536 ft. 538 ft. 540 ft. 542 ft. 544 ft. 546 ft. 548 ft. 550 ft. 552 ft. 554 ft. 556 ft. 558 ft. 560 ft. 562 ft. 564 ft. 566 ft. 568 ft. 570 ft. 572 ft. 574 ft. 576 ft. 578 ft. 580 ft. 582 ft. 584 ft. 586 ft. 588 ft. 590 ft. 592 ft. 594 ft. 596 ft. 598 ft. 600 ft. 602 ft. 604 ft. 606 ft. 608 ft. 610 ft. 612 ft. 614 ft. 616 ft. 618 ft. 620 ft. 622 ft. 624 ft. 626 ft. 628 ft. 630 ft. 632 ft. 634 ft. 636 ft. 638 ft. 640 ft. 642 ft. 644 ft. 646 ft. 648 ft. 650 ft. 652 ft. 654 ft. 656 ft. 658 ft. 660 ft. 662 ft. 664 ft. 666 ft. 668 ft. 670 ft. 672 ft. 674 ft. 676 ft. 678 ft. 680 ft. 682 ft. 684 ft. 686 ft. 688 ft. 690 ft. 692 ft. 694 ft. 696 ft. 698 ft. 700 ft. 702 ft. 704 ft. 706 ft. 708 ft. 710 ft. 712 ft. 714 ft. 716 ft. 718 ft. 720 ft. 722 ft. 724 ft. 726 ft. 728 ft. 730 ft. 732 ft. 734 ft. 736 ft. 738 ft. 740 ft. 742 ft. 744 ft. 746 ft. 748 ft. 750 ft. 752 ft. 754 ft. 756 ft. 758 ft. 760 ft. 762 ft. 764 ft. 766 ft. 768 ft. 770 ft. 772 ft.

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THE IRON AGE

THURSDAY, AUGUST 9, 1888.

New Geared Press.

We present on this page an engraving of a new single crank geared press recently built by the E. W. Bliss Company, of Brooklyn, N. Y., and specially adapted for manufacturing heavy articles from sheet brass, iron and steel. The heavy

explain the action. Upon the shaft, which is of hammered steel, is forged an arm or projector, M. The balance-wheel takes a bearing on the outer end of the shaft at N, on which it runs loose, held in place by the end collar E. The hub of the wheel is enlarged on its inner side, as shown in Fig. 2, to cover the projection M on the

every time one of the steel shoes, H and I, passed over it. To obviate this a stationary shoe, L, is attached to a bracket bolted to the side of the press. This holds the pawl F clear of the wheel. The latch K is pivoted, as shown in Fig. 2, and can be thrown out sideways by a connection with the treadle. When so removed the pawl

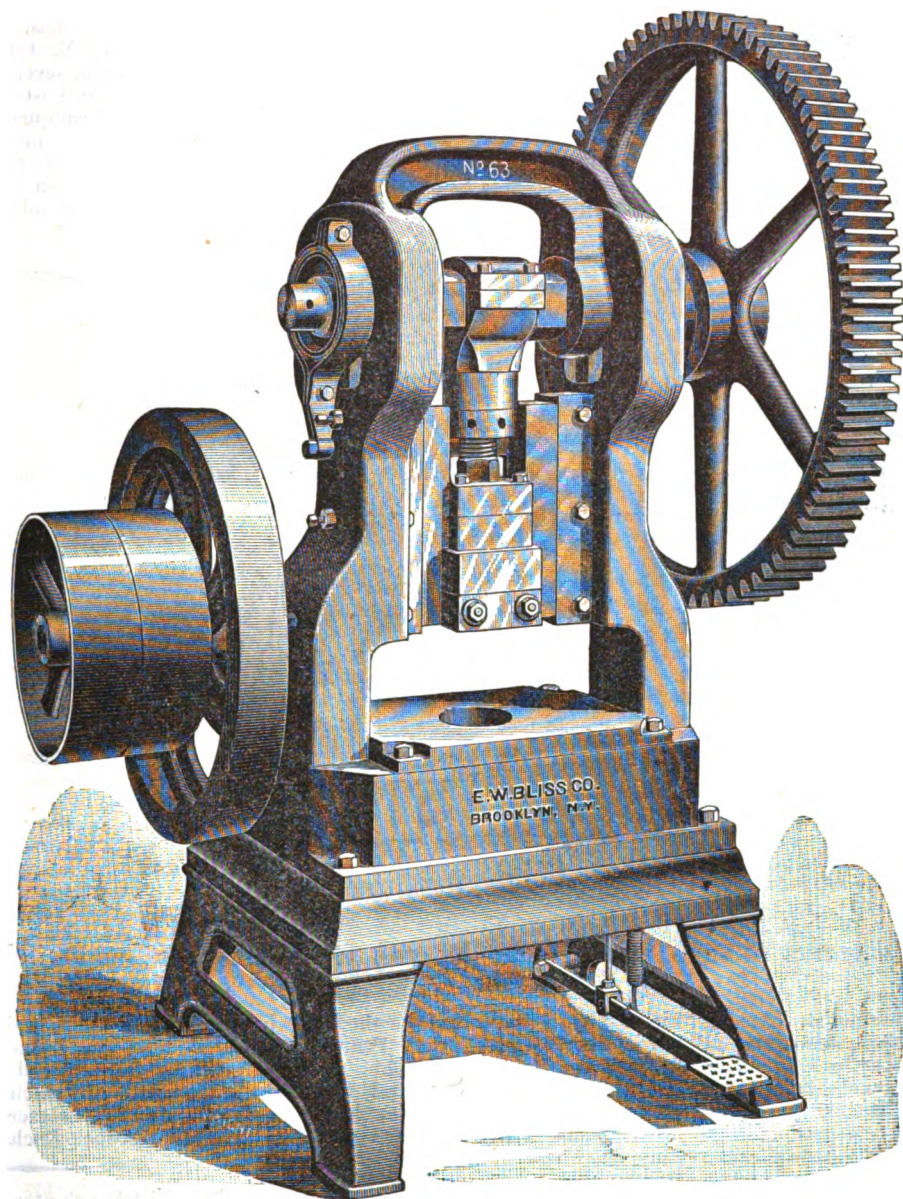


Fig. 1.—General View.

NEW SINGLE-ACTION GEARED PRESS, BUILT BY THE E. W. BLISS CO., BROOKLYN, N. Y.

arch-shaped body is supported on an iron table, having strong frame legs. The slide has long adjustable bearings, and is provided with a steel binding cap to hold the shank of the punches. A shaft running in bearings on the back of the press frame is driven by pulleys 24 inches in diameter, and is provided with a fly-wheel to give steadiness of motion. On the opposite end of this shaft is a pinion which drives the large spur gear on the main shaft, and motion is communicated to the crankshaft at will by means of a new and very powerful clutching device connected with the treadle. Details of this clutch are given in Figs. 2, 3 and 4, on the next page. These clearly

show the action. The two sides of this projection are counterbored, and into these counterbores are fitted two steel pawls, F and G, which engage against steel shoes H and I in the enlarged hub of the balance-wheel, locking the wheel securely to the shaft in both directions. The arrangement for disengaging the pawls from the wheel is shown in Figs. 2 and 4. The pawls project beyond the hub of the wheel and are shaped as shown at F and G in Fig. 4. The pawl G rests upon a latch, K, and when in this position is held clear of the wheel, allowing the latter to turn freely upon the shaft. The other pawl, F, would not require any mechanism to hold it out, except on account of the click noise it would produce

G is thrown outward by means of a light spring, not shown, and engages against one of the steel shoes in the wheel, causing the shaft to revolve. As soon as the latter has turned a short distance the other pawl F is carried from under the shoe L and is allowed to engage in the opposite notch of the wheel, thus locking the wheel to the shaft both ways. When the shaft has made one revolution the outer end of the pawl G strikes the latch K (if the foot has been removed from the treadle) and throws the shaft clear of the wheel, allowing it to come to rest, as explained above. This makes a very powerful clutch, with small liability to derangement, and one which insures

great security in operating the press. A friction strap on the end of the crank shaft insures the stopping of the slide at the upper part of the stroke. The general dimensions of the press are as follows: Width between uprights, 32 inches; opening in bed, 14 x 18 inches, or as required by the work to be done; motion of slide 1 to 6 inches. The steel crankshaft is 5 inches in diameter, and the bearings are 10 inches long. The spur gear is 60 inches in diameter, with 6-inch face, and the ratio of gearing is $7\frac{1}{2}$ to 1. The fly-wheel is 45 inches in diameter, 6 inches wide and weighs 900 pounds. The total weight of the press is 10,500 pounds.

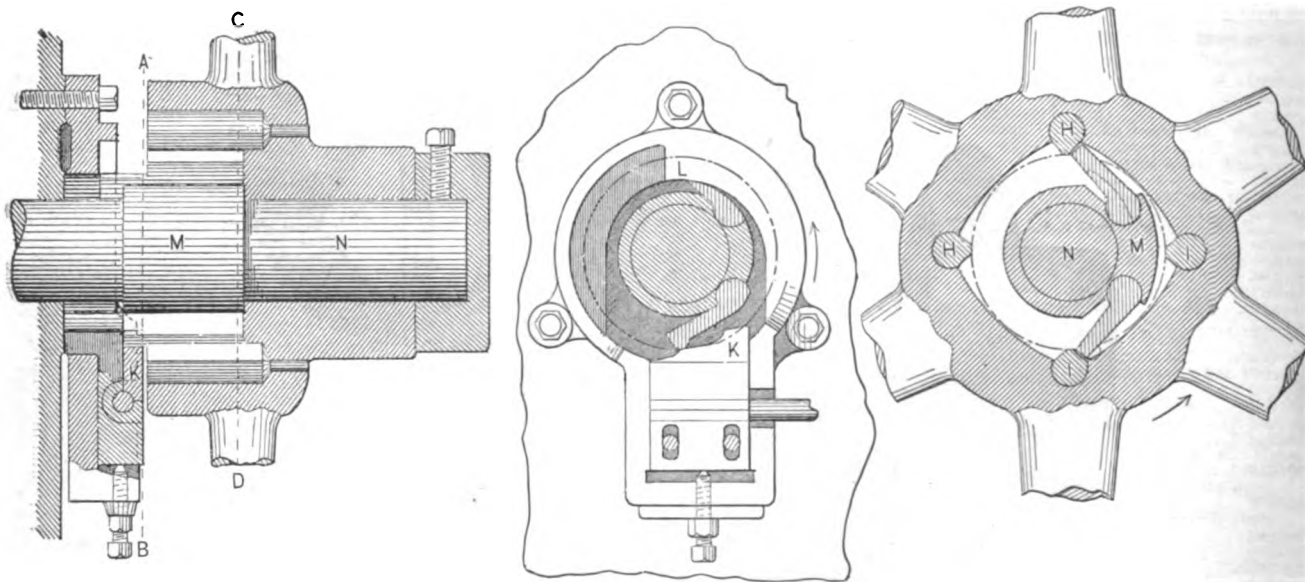
Tests of Homestead Steel.

Carnegie, Phipps & Co., Limited, of Pittsburgh, Pa., have printed a neat little pamphlet giving the records of 1057 tests of Bessemer and open-hearth steel in April and May, 1888, as made by the inspectors of the purchasers. Out of all the tests

strength and 20 per cent. elongation in 8 inches. For the Keystone Bridge Company 72 tests were made of 6 x 6 inch steel angles, the requirements being 30,000 pounds elastic limit, 56,000 pounds to 64,000 pounds ultimate strength and 20 per cent. elongation in 8 inches. Here, as in the other cases, the requirements were far exceeded. Among the other lots tested were bars and billets for the Union Bridge Company, the Edge Moor Iron Company, N. F. Palmer, Jr. & Co. and the Boston Bridge Company, the latter being placed. All this metal was Bessemer steel.

Among the open-hearth steel tests were a number of specimens for Government ship plate, calling for a tensile strength of 60,000 pounds and an elongation of 25 per cent.; also high boiler shell steel in which the requirements were 58,000 pounds to 67,000 pounds tensile strength, with an elongation not less than 20 per cent., and low boiler flange steel for the Government, in which the specifications were 50,000 pounds to 58,000 pounds tensile strength and 26 per cent. elongation.

the owners and capitalists and resulted in the above combination. The three mining companies are the Main Jellico Mountain Coal Company, the East Tennessee Coal Mining Company and the Jellico Coal and Coke Company. These corporations have been operating for some years, and have worked up a demand for the Jellico coal, which is of such superior quality and free from slate and clinkers as to bring in the markets even price with the Pittsburgh article. The combination will operate on a larger scale than the three mines collectively, and will now probably be able to meet demands. The directors of the consolidated company are Moritz Lippman, M. E. Thornton, J. E. Redfield, B. A. Jenkins, Chas. F. Johnston, Thos. Corcoran, W. N. Culp, St. John Boyle, Ed. F. Madden, several incorporators and directors being Eastern men. Louisville will be the headquarters, with sub-quarters in New York and Philadelphia. Besides the interests of the three companies the new corporation have purchased over 100,000 acres of mineral lands in Bell



Figs. 2, 3 and 4.—Details of Clutch.

NEW SINGLE-ACTION GEARED PRESS, BUILT BY THE E. W. BLISS CO., BROOKLYN, N. Y.

only three rejections were noted. Among the articles so tested were steel slabs for the Phoenix Iron Company, calling for an elastic limit of 30,000 pounds, an ultimate strength ranging from 58,500 pounds to 66,500 pounds, and an elongation of 20 per cent. in 8 inches. Out of the six tests the minimum elastic limit was 41,430, while the maximum reached 43,130, the highest ultimate strength was 66,440 and the lowest 60,760 pounds per square inch. The elongation fluctuated between the limits of 25.62 per cent. and 28.75 per cent. Ten tests of slabs for the same company in which the requirements were 32,000 pounds elastic limit and 64,000 to 70,000 pounds ultimate strength showed similarly excellent work. One hundred tests of steel bars, angles, billets and slabs were made for the Edge Moor Iron Company, in which the requirements were 35,000 pounds elastic limit 62,000 to 70,000 pounds ultimate strength and 22 per cent. elongation in 8 inches. For the Union Bridge Company steel for bars and angles was made calling for 40,000 pounds elastic limit, and 67,000 pounds to 75,000 pounds ultimate strength. For the Edge Moor Iron Company 121 tests of steel blooms, billets and slabs were made, for which the specifications were 30,000 pounds to 34,000 pounds elastic limit, 60,000 pounds to 68,000 pounds ultimate

Fire-box steel was made for the Baldwin Locomotive Works, the Pennsylvania Railroad, Baltimore and Ohio Railroad and the New York Central Railroad. There were also tests of marine flange steel for Dunham, Carrigan & Hayden Company, the New England Ship Building Company, the Atlas Engine Works and the Erie City Iron Works. For Ritter & Conley tank steel was made, for which the requirements were 60,000 to 65,000 pounds tensile strength, with an elongation in 8 inches of 18 per cent. Open-hearth bridge steel was produced for the Phoenix Iron Company, the Edger Moor Iron Company, the Massillon Bridge Company and the King Iron Bridge and Mfg. Company, the requirements varying considerable in the different cases. The tests throughout show an excellent metal, very uniform and generally far above specifications.

The United Jellico Coal and Iron Company, of Louisville, Ky., have been formed by the consolidation of three of the mining companies of the Jellico district. The scheme was devised recently by a coal man, who entered into correspondence with several Eastern capitalists. Coal experts were sent to Kentucky to thoroughly investigate the deposits, and on their favorable report negotiations were entered into by

Harlan, Knox and Whitley counties, and a large tract in Tennessee. The capital stock has been placed at \$6,000,000, the largest part of which has already been taken, and the balance will be put on the New York Stock Exchange.

The Pittsburgh Steel Casting Company have produced at their works a cast steel shell, the first ever made in the United States. Superintendent Hainsworth says a few hundred steel shells have been made in England, but they were cut from a forged ingot and then bored, necessarily making them very expensive. The shells which the Pittsburgh works are manufacturing are conical in shape, 6 inches in diameter at the largest and tapering to a point $2\frac{1}{4}$ inches, and weigh 95 pounds. Fifty pounds of powder will throw the projectile a distance of $6\frac{1}{2}$ miles and it will travel at the rate of 2000 feet per second. Mr. Hainsworth has experimented two years and is now confident that his shell will fulfill the expectations of the world. The Pittsburgh Steel Casting Company have received an experimental order for 500 shells, which will be followed by one of 2000.

General Duane is permanent chairman of the new Aqueduct Commission.

The Coke Fields of Connellsville, Pa.

From the *Connellsville (Pa.) Courier* we take the following interesting description of the Connellsville coke regions:

The famous coke region to which Connellsville has given a name and of which it is the geographical and business center is embraced in a long, narrow strip of land stretching away almost in a bee line from Latrobe, Pa., on the north, to Morgantown, W. Va., on the south, a distance of 50 miles or more. It varies in width from less than 1 mile to more than 5 miles, being widest in the vicinity of Connellsville, which is the basin, and averaging 2 miles. Its area is therefore approximately estimated at 100 square miles, or 64,000 acres. Fully one-fourth of this acreage has been worked out and another fourth consists of barren measures, leaving but 80 odd thousand acres of coal intact. Prices vary from \$200 to \$600 per acre, according to location, depth, thickness and pitch of vein, railroad facilities and surface advantages, but it is safe to place the average value at \$300 per acre, making the aggregate value to-day of the coal yet unmined in the Connellsville region at a round \$10,000,000. As the coal continues to be worked out, however, its value continues to increase. Though such increase in value has not been marked thus far because of the comparatively insignificant consumption until within a very recent period, it is now becoming quite apparent to the dullest mind, and the next decade will witness a decided advance in the price of coal lands. The most reliable data indicate that the coal supply will last about 40 years at the present rate of consumption. This contingency was foreseen several years ago by some of the largest operators in the region, notably the Connellsville Coke and Iron Company, and the H. C. Frick Coke Company, which firms have succeeded in securing an aggregate acreage equivalent to one-half the coal remaining in the coal region to-day. Though the prices paid were sometimes liberal to the point of extravagance, the wisdom and foresight of the investment is now generally conceded.

Though the Connellsville coke region embraces but a few thousand acres, its financial operations aggregate millions. Its average annual capacity is 5,000,000 tons of coke, valued at from \$5,000,000 to \$10,000,000 according to the mood of the coke operators and the tendency of the iron market. Last year coke remained at \$2 per ton for the better part of the year. To-day it is just one-half less in price. This ruinous reduction was inaugurated by a bad iron market, and completed by the failure to form anew the old coke pool, under which prices had been judiciously kept to a plane of reasonable profit by concerted action. There are 74 coke plants in the region, varying in size from 16 ovens at Great Bluff to 707 at Standard, and aggregating 18,047, which, together with the pit cars, larries, locomotives, tipples, tenement houses and other adjuncts, represent an outlay of \$6,000,000. The surface is worth another \$4,000,000. Thus it will be seen that this slender strip of Pennsylvania territory is worth the sum of \$20,000,000, or more than enough to build and equip the South Pennsylvania Railroad. The coal is taken out from drift, slope and shaft mines. Drift mining is the oldest, the cheapest and the easiest method, and slope mining comes next. Both are in the most general use, but shafts, though very expensive, have sometimes been found necessary. There are 12 shafts in the region, varying in depth from 50 feet at Morewood to 550 feet at the new Leisenring No. 3 works.

Estimated on the basis of figures taken from the books of one of the largest coke firms in the Connellsville region, the

amount paid out annually for labor, when the region is running full, is \$5,000,000, or an average annual wage for each of the 10,000 employees of \$500. But the frequent strikes and lockouts of last year greatly reduced these figures, and the present low price of coke has cut down the wage scales of last year from 15 to 25 per cent. During the boom in trade the average price for mining was \$1.05 per 100 bushels; now it varies from 75 cents to 90 cents. There is, in fact, no longer any uniformity in wages. Each operator is trying to get his work done as cheaply as possible in view of the ruinous price of coke. The H. C. Frick Coke Company pay the highest wages, based on \$1.35 coke, as follows: Miners, 90 cents per 100 bushels; coke drawers, 58 cents per 100 bushels charged, or from 60 to 75 cents per oven; other labor from \$1.35 to \$1.95 per day. Other employers pay as follows: Miners, per 100 bushels, 80 cents; coke drawers, from 55 cents to 70 cents per oven, and other labor from \$1.12½ to \$1.80 per day.

The Connellsville coal averages 8 feet in thickness, the maximum being 9 and the minimum 7 feet. There are 375,000 bushels of coal in an acre, but it is impossible to mine more than 300,000 bushels. The ovens are charged with from 110 to 140 bushels of coal and yield from 8 to 4 tons of coke every 48 hours, except those charged on Friday which burn over Sunday, making 72-hour coke. In order to restrict the output a general suspension of work for one and sometimes two days in the week is often observed, in which case 72-hour coke is the product two and three times in the week. This slowly burned coke has long been regarded as superior to the 48-hour product, but the notion is being exploded. Forty-eight-hour coke is now regarded equally good, if not better, for furnace purposes, while the 72-hour product is preferred by foundrymen. The ovens vary in size from 10½ to 12½ feet in diameter, the standard size now being 12 feet. Experienced coke makers question the wisdom of building them larger, saying that their observations lead them to the belief that the 12-foot ovens give a proportionately better yield than those larger. Pit wagons vary in capacity from 30 to 50 bushels, and the iron larries from which the ovens are charged from 120 to 190 bushels. The standard larry holds 130 bushels and the standard pit wagon 38½ bushels. Both are usually moved by mule power, but wire rope haulage is gaining much in favor, especially in the pit. At large works the charging is done by small locomotives which run on top of the ovens and haul several larries at a time. A great deal of water is used in cooling down the glowing coke when it is pulled from the oven, and the lack of it has often been severely felt by more than one operator during the dry season. Thos. Lynch, Superintendent of the H. C. Frick Coke Company's works, estimates the consumption at those works at 600 gallons per oven daily. At this rate it would require 7,500,000 gallons per day for the region. But the Frick company have a water-works of their own, supplied from the Yough River, and their consumption is therefore not limited, so that more water is probably used at these works than at others where the supply is scarcer.

Three trunk line railroads penetrate the coke region and grow fat upon its immense and immensely profitable tonnage. The rate from the region to Pittsburgh alone is now 80 cents per ton and has long been \$1. It is safe to say, therefore, that the Southwest Pennsylvania, the Baltimore and Ohio's Pittsburgh division and the Pittsburgh, McKeesport & Youghiogheny railroads divide not less than \$4,000,000 annually for tonnage from the region, while the main lines to which they are but

feeders earn many millions more in carrying this coke to the Eastern and Western markets. There are 8000 cars employed in the coke trade, over 8000 of which are individual cars, and these branch railroads alone give employment to several thousand additional men.

Coating Metal Plates With Tin.

A patent has recently been granted in England for a process of coating metal plates with tin which possesses certain features of interest. The inventor, we presume, was instigated by the complaints concerning pin holes in tin plates, which trouble is generally ascribed to the imperfect washing, which allows enough acid to remain to corrode the plate after coating. The principal object of this invention, however, as stated by the patentee, is to reduce the amount of dross which is occasioned by passing the wet plate through the bath of molten tin. The wet plates, according to this method, after being taken out from the acid pickling bath, are washed or swilled with an alkaline solution for the purpose of removing every trace of acid. This neutralizing solution consists of a mixture of ammonia and palm oil. The next step in the process to which the plates are subjected is passing them through a series of rollers. The first pair of rollers are of metal, and are used to flatten and straighten the black plates. The second pair of rollers are of India rubber or of some other soft material, which squeezes off the moisture on both sides of the plates, and the final pair through which the plates are passed are kept coated with grease. After passing through this series of rolls the plates are dipped in molten tin and treated in the usual manner. The two features especially noticeable in the above process are the use of an alkaline solution and the soft rolls for drying the plates, though we are not positive that this is the first time that the former has been applied.

Announcement is made of the formation of the Redstone Coal and Coke Company, at Uniontown, Pa., with a capital stock of \$50,000. It is composed mainly of Philadelphia capitalists. Jacob E. Ridgeway, of Philadelphia, is president, and George Douthett, of the same city, is secretary and treasurer. The Board of Directors are as follows: Jacob E. Ridgeway, General Lauffer and Dr. Brown, all of Philadelphia, Col. A. L. McFarland and F. C. Shallenberg, of Irwin; James McKay, of Pittsburgh, and Samuel S. Graham, of Brownsville. The company own 3300 acres of coal land on the line of the Pittsburgh, Virginia and Charleston Railroad, and have recently purchased the Parkhill mill property, consisting of 46 acres of surface, on which a plant will be erected for the mining and shipping of coal on a large scale. A shaft will be sunk and a few coke ovens built to utilize the slack. The attorney for the company states that operations will be begun at once to open up the territory.

The new gas plant of Henry Disston & Sons, at Tacony, Pa., to which we referred at some length in *The Iron Age* several months ago, was started last week. The plant has cost over \$40,000, including holders and pipes, and is intended to supply with fuel, not only the great establishments of the Disston's, but any other of the manufacturing concerns in the neighborhood which may wish to use it.

It is of general interest to note that the Pennsylvania Railroad Company intend trying one of the Webb compound locomotives for their fast passenger traffic. We understand that an engine has been finished at Manchester, England, and is ready for shipment. The experiment will no doubt be attentively watched.

The Rich Hill Fire-Damp Explosion.

Under date of June 9 Oscar Kochtitzky, Commissioner of Labor Statistics and Inspection of Missouri, has submitted a special report to the Governor of that State on the investigation of the mine explosion at Rich Hill, Mo., on the 29th of March, 1888, in shaft No. 6 of the Keith & Perry Company's coal mines, by which 23 persons were killed and a large number injured. The report in question is accompanied by reports of Hon. M. L. Wolf, State mine inspector; by Prof. W. B. Potter, mining engineer of the Washington University, St. Louis, and Messrs. E. A. Scammon and Robert Craig, experts. Practically they all agree in the verdict formulated by Professor Potter, whose report contains the principal features. The mine was thoroughly equipped with machinery for ventilation, was properly opened up, and seems to have been under very careful officers. The famous disaster, from the testimony submitted, was due principally to the use of excessively heavy shots in the system of getting the coal without under-cutting, and entirely by blasting in the solid. It seems that contrary to orders three very heavy shots were put into one heading, which caused certainly one and possibly more to blow out. This led to an explosion, in which the coal dust of the dry mine must have played an important part. Professor Potter has made a series of analyses of the lump, nut, pea and dust coal which showed that the proportion of volatile matter, even in the lump coal, is quite large, and that the fine dust is nearly one-third of its weight of volatile matter, notwithstanding the large increase in the proportion of the incombustible mineral matter or ash. After the first explosion the ventilating system was stopped, and the concussion of the explosion, and possibly the few shots fired subsequently to it in other rooms, as well as unburned gas accumulated in the workings, brought about a second explosion, which killed some of the men who had escaped the first disaster. The system of mining seems to have been extremely wasteful of powder, 337 kegs of 25 pounds each being used during the month of March in producing 6340 tons of coal. This is equivalent to an average of 18.81 tons of coal per keg of powder, while the average for the whole State in 1887 was 82.12 tons, and in St. Clair County, Ill., 194.3 tons. Professor Potter urges that the mining laws be modified so as to prohibit this system of getting coal by working in the solid without under cutting, and concludes his report by stating that in his judgment the disaster was due to criminal carelessness on the part of the miners, and a persistent use on their part of methods of getting the coal which cannot be too severely condemned, and which, from the evidence submitted, seems to have been contrary to the rules and regulations of the officers of the company.

From a recent issue of the Beaver Falls, Pa., *Tribune*, we take the following information regarding the industries at that place: "The hammer department is the only department running at the Beaver Falls Steel Works, and it is doubtful whether it will be enabled to shut down or not, orders are so pressing. The rest of the mill is being put in good repair. At the Penn Bridge Works a number of carloads of iron have been received and the full complement of men are working. The firm have a large number of orders on hand. The Hartman Manufacturing Company have got settled down in their new quarters, and everything is running very smoothly. Orders for wire picket fence continue to pour in, also for wire mats. The saw works of Emerson, Smith & Co. still continue to run full handed on ten-

hour time. Orders very fair. At the shovel works of H. M. Myers & Co. the rolling mill department is running on double turn, and the balance of the work on single turn. The axe works of Hubbard & Co. are running on full time in every department."

New Caliper Gauge.

Messrs. Tickell & Dyson, of Cleveland, Ohio, are putting on the market the new caliper gauge shown on this page.

The engravings clearly explain its arrangement. The gauge is specially designed for measuring recesses, in doing which the taper pin, as shown in Fig. 2, is pulled out and the tube H is slid outward until the opening, marked 3, registers

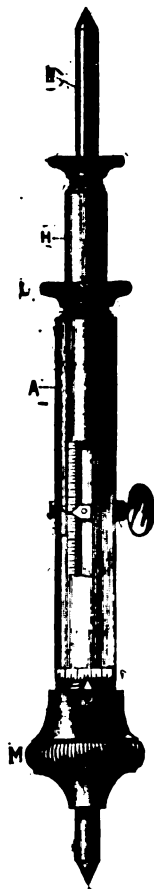


Fig. 1.—Elevation.

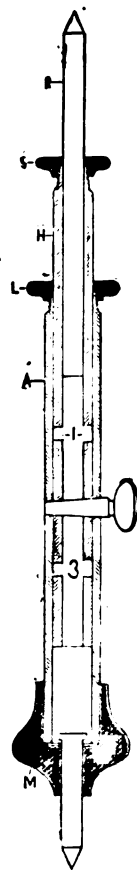


Fig. 2.—Section.

New Caliper Gauge, Made by Messrs. Tickell & Dyson, Cleveland, Ohio.

with the opening in the case through which the transverse pin is passed. This pin locks the tubes together. The arm R is then drawn out until the point comes in contact with opposite side of the recess to be measured, and is clamped by the nut S. Fine adjustments can be made by means of the nut M, which is provided with an index moving over a scale, as shown. In order to remove the gauge from the recess the stop pin is withdrawn and the tube H moved inward in the outer tube A, so as to shorten the gauge and permit its easy removal. The tube H can then be moved out in the tube A until the openings in them register as before. The stop pin being then inserted the gauge will indicate the exact diameter as before.

Fig. 1 is a front elevation showing the slot and the finger which is attached to the inside tube H and is adapted to sweep over the scale, moving in the longitudinal slot. The finger registers exactly with the holes 1, 2 and 3, Fig. 2. Every one of the divisions swept over by the index on the nut M represent $\frac{1}{1000}$ inch longitudinal motion of the gauge rods. The gauge will be made in sizes ranging from 2 to 40 inches.

Pumping Oil Long Distances.

The grand experiment of pumping crude oil from Lima, in Ohio, to Chicago, a distance of 206 miles, is being practically tested, and the result will be known perhaps to-day, when the flow of oil, which is traversing the pipes at the rate of 20 miles a day, is expected to be announced. The preliminary test made with water gave promise of success. The longest distance which oil has been piped heretofore is 87 miles, from Bradford to Buffalo, but, as it appears to be necessary only to add to the number of intermediate pumps to correspond with the distance covered, the indications are that oil-pipe lines can be indefinitely extended, unless intervening mountains or streams present an insuperable barrier.

The proposition to pipe gas from the interior of Pennsylvania to New York City was generally regarded as wholly chimerical, but since then views have changed to conform to established facts. Oil for fuel purposes in Chicago, if available in adequate supplies, will have a deep significance not only as bearing upon the industrial interests of that but other cities. If a barrel of Lima oil is the equivalent of 1 ton of coal, and can be provided at 60 cents for that quantity, it will become necessary to revise calculations respecting the costs of manufactured products.

Plea for the American Ship.

An earnest plea for the American ship is made by F. J. Babson in the *Marine Journal*. He says:

From the launching of the iron propellers on the Clyde dates the decline of the American ocean marine. The first cost of iron vessels in 1845 was \$100 per ton in Great Britain, and in 1887 it had been reduced to \$50 per ton, and some were built for \$40. The same disparity exists in favor of England in the cost of iron ships that insures to the United States in wooden ships. The shipbuilders of the United States have grappled with this problem with a skill and perseverance that deserves better consideration than has been awarded it. They have reduced the cost of first-class iron ships from a cost of \$100 per ton in 1850 to \$65 in 1884.

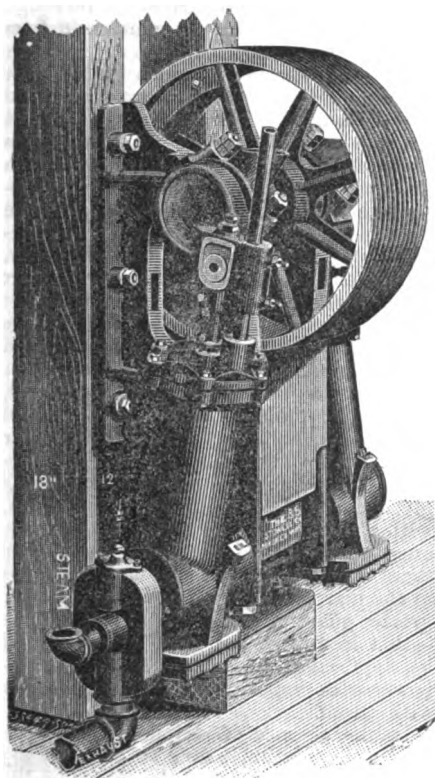
The American shipping interests find themselves confronted by a majority of the House of Representatives that propose to destroy American shipbuilding by passing the Dunn Free Ship bill by which English owned ships can, by the whitewashing process, be placed under the American flag and without the actual purchase of a single vessel but merely by the transfer process will completely neutralize and destroy the building of iron ships by American mechanics. Our coasting trade and coast lines of steamship transportation that since the formation of the Government have been protected from foreign invasion will also be open to the competition of British built and British manned vessels under the same process, and the fisheries share the same fate.

Great Britain has 17,000,000 tons of shipping of all kinds. The United States has 4,000,000 tons, of which 3,000,000 is domestic or coasting tonnage. Great Britain must of necessity develop her power and wealth by means of the ocean. She will subsidize to the last dollar to keep every ton of her shipping afloat, nor will she scruple at any means to take possession of the trade of any country.

An employee of the Aetna Iron and Steel Company, of Bridgeport, Ohio, has gotten up a device which enables rolls to be dressed in the housing without decreasing the speed of the engine so as to necessitate the closing down of the departments connected with the power.

Steam Feed Engine for Sawmills.

The Filer & Stowell Company, of Milwaukee, Wis., have recently made some improvements in their steam feed engines for sawmill use, the latest design being shown in the engravings on this page. The engines are of the oscillating type, and hence have no links or eccentrics to slip or get out of order. The first feed of this general design was placed in the mill of Messrs. R. J. Brent & Co., Pensacola, Fla., nearly three years ago, handling a 60-foot carriage. The engines have a smooth, uniform motion, are easily controlled, and economical in the use of steam. The cut illustrates a size designed especially for



*Improved Steam Feed Engines for Saw Mills,
Built by the Filer & Stowell Company,
Milwaukee, Wis.*

the Pacific Coast. With this the carriage may travel to suit length of any log up to 150 feet.

Electric Launches.—A novelty seen in New York harbor a short time ago was a trim little pleasure boat, 28 feet by 6, driven by electricity. But unfamiliar though it may be on this side of the ocean, this motor has more than once been used for small boats. Several years ago a launch was fitted with electric motors on the Thames, and made many trips there, carrying a large number of passengers. Soon after, at the Vienna Exposition, either this same craft or another of English make, plied constantly in pleasure trips, working to general satisfaction. An electric boat was then built by Yarrow & Co. for the Italian torpedo service. It was 36 feet long by 6½ feet beam, its propeller being driven by a duplex Reckenzaun motor, and it achieved a speed of about 8½ miles. It was put in service at Spezzia. This vessel was surpassed in celebrity by the volta, which first achieved the distinction of a trip across the British Channel and back, between Dover and Calais, a distance of about 24 miles each way. The Volta was about 37 feet long by 7 feet beam and 3½ deep, and had a battery of 61 cells. It could be worked by a single person by simply turning an iron handle to the right or left for steering

while this switch also started and stopped the vessel. Practically the same arrangement is found in the launch used in New York harbor. The time has not come, of course, for any general substitution of electricity for other motors on shipboard. Nevertheless, there are certain advantages in the electric launch that may gradually increase its use, especially for specific purposes.

The Navy.

If all the vessels provided for by both Senate and House bills are agreed to in conference and their building will be authorized, the foundation of the new navy will stand about as follows:

One sea-going armored turret ship of 7500 tons, carrying four 12-inch guns, and developing a speed of 17 knots. The armor will be made up of 16-inch steel plates.

One armored rigged cruiser of 6600 tons (the Maine, building at New York), to carry four 10-inch guns in revolving turrets and six 6-inch guns in broadside mounts.

One armored turret ship (the Texas, building at Norfolk), about 6600 tons, carrying two 12-inch guns in revolving turrets, with six 6-inch guns in broadside mounts.

One 5300-ton protected cruiser, of the Reina Regente type, in pending bill, and carrying four guns either 8 or 10 inch—which has not yet been decided—and eight 6-inch guns, capable of steaming 20 knots an hour and having a maximum coal capacity of 1200 tons.

Five steel cruisers, all now building and heretofore fully described—viz., the Newark, Philadelphia and Baltimore at Cramp & Sons', and the San Francisco and Charleston at San Francisco.

The aggregate armament of the above-named vessels will be 54 guns, mostly 6-inch, with powerful secondary batteries.

Two steel cruisers in the bill now pending of 3000 tons each, to have 19-knot speed, each armed with main batteries of six 6-inch guns, but to have also secondary batteries of extraordinary power.

The steel cruisers in the bill now pending of 2000 tons displacement, speed not specified in the law, but probably not under 18 knots, main batteries of six 6-inch guns and also heavy secondary batteries. They will probably have a light three-masted schooner rig, similar to the Yorktown.

Three 1700-ton gunboats are the Yorktown, nearly completed at Cramp & Sons' yard; the other two, the Concord and Bennington, about four-tenths completed at Roach's old yard, Chester, under the management of Mr. G. W. Quintard and N. F. Palmer, Jr. These vessels will have a speed of about 16 knots and carry six 6-inch guns and suitable secondary batteries. The Bennington and Concord will be in the water about the close of the year.

The Petrel, building at Baltimore, has about 870 tons displacement, is six-tenths done, and, it is expected, will soon be launched. She will carry four 6-inch guns.

In addition there is the dynamite cruiser ready for trial next month, and the torpedo boat Stiletto, built by Herreshoff; two submarine torpedo boats, recently bid for by Cramp & Sons, and which bids are now under consideration, two single-turreted monitors of about 3500 tons displacement, to carry each one 16-inch 110-ton gun in a revolving turret, together with one pneumatic tube in the bow to be capable of discharging an aerial dynamite torpedo containing a charge of ¼ ton of the highest explosive. The designs for these two vessels are now being finished in the Bureau of Construction in the Navy Department, and bids for them will shortly be called for.

The Motive Power of the World.

The statistical office of the German Government has recently published some interesting particulars on the present state of mechanical power, from which we select the following: Four-fifths of the engines working at present have been built during the last 25 years. The total steam-engine power of the United States represents 7,500,000 horse-power; of Great Britain, 7,000,000; Germany, 4,500,000; France, 3,000,000; Austria, 1,500,000. In these numbers the power of locomotives is not included; these number 105,000, and represent a total energy of 3,000,000 horse-power. This, added to the other engines, produces a total of 46,000,000 horse-power for the entire globe. Taking an engine horse-power as equal to the power of three actual horses, and a horse as equal to seven men, the steam engines of the earth equal approximately the laboring power of 1,000,000,000 of men, which is more than double the entire working population of the earth. The total population of the globe is calculated at nearly 1,500,000,000, two-thirds of which, including children, are not engaged in any mechanical work at all. We must, however, take into consideration that the use of steam-power is up to the present almost exclusively in the hands of Europeans and their descendants in the New World, and that Asiatics, who form by far the greater part of the earth's population, up to the present hardly use it at all. Bearing this in mind, we shall not be far out by concluding that the mechanical power of Western nations has been increased six-fold by the invention of the steam engine, while the productiveness of this power in manufacture has been further increased by all kinds of manufacturing machinery.

A Colorado Line of Two Feet Gauge.

—The experiment of building a railroad of 2 feet gauge was undertaken a few years ago in Massachusetts, but the road (the Billerica and Bedford) was not a financial success, and the rails and rolling stock were removed and laid down in Maine, where a line of some length is now in operation. The first road of this miniature gauge in the West has just been opened in Colorado, running some 10 miles from Black Hawk into a mountain mining region. The average grade is about 190 feet to the mile, reaching in some places as much as 264 feet; and curves as short as 90° are operated. The largest locomotive, with tender loaded with fuel and water, weighs only 20 tons, and another is half that weight. This little road carries a good deal of ore, and is expected also to develop a considerable excursion traffic.

J. H. Ralston has submitted to John A. Kruse & Co., of Chicago, a report on the iron ore deposits of Marion County, Texas, which is printed in the Texas *Iron News*, of Jefferson. Mr. Ralston figures the cost of charcoal iron at \$12, putting 50 per cent. ore in at \$1.50, 110 bushels of charcoal at 6 cents a bushel, limestone 75 cents, and salaries and labor at \$1.05. An analysis by Chauvenet & Blair, of St. Louis, shows the ore to contain 63 per cent of iron, 5.45 per cent of silica, a trace of phosphorus, and 0.53 per cent. of sulphur.

The Tamarack-Osceola Copper Mfg. Company, Dollar Bay, Mich., will erect two wire mills. There will be two buildings, 100 x 50 feet each, joined together at the ends, with an open court between. The capacity of the wire mills will be 10,000 pounds of fine wire per day of ten hours, or 20,000 pounds when working day and night.

Cost of Mining Iron Ore.

Gogebic and Menominee.

Last year Mr. George W. Maynard, of New York, made a thorough examination of a number of properties on the Gogebic and Menominee ranges. The very elaborate report contained a number of statements of cost of mining which are of particular interest, since they give actual figures. They show how many items enter into cost which those not familiar with mining work do not think of including.

Cost at Iron King, July, 1887.

Explosions.....	\$35.75
Fuel.....	402.85
Oil and waste.....	48.75
Timbering.....	2,932.71
Mining.....	9,084.37
Interest and discount.....	1.56
Assay.....	60.00
Office expense.....	43.65
Teaming.....	555.27
Landing and Trammings.....	404.75
Surface labor.....	538.83
Blacksmithing.....	203.74
Holsting and pumping.....	918.37
Captain, bosses and clerks.....	346.25
Management expense.....	33.56
Total.....	\$16,220.41

9976 tons mined, \$1.626 per ton.
Total mined to July 30, 62,247 tons, \$1.896 per ton.

Mr. Maynard gives costs, also, for the Kakagon Mine, but, as they were for an exceptional period, when nothing but extraction work was going on and no outlays were being made for development, we omit them.

The following figures deal with the cost at the Iron River Mine, in the Menominee region.

Cost at Iron River, Menominee:

	Labor cost.		Total cost. Dec., 1885, to Dec., 1886.
	Dec., 1885, to Dec., 1886.	Dec., 1886, to Dec., 1887.	
Mining.....	\$0.561	\$0.342	\$0.715
Surface.....	.107	.149	.106
Sinking.....	.062	.157	.063
Drifting.....	.036	.142	.062
Isabella.....	.....	.423	.....
Teaming.....	.010	.021	.016
Engine No. 1.....	.029	.057	.111
Steam Pumps.....	.012	.021	.024
Car pen- ter shops.....	.055	.071	.....
Blacksmith.....	.016	.025	.034
General ex- penses.....	.025	.029	.040
Fuel.....	.009	.052	.....
Filling and timbering.....	.066	.....	.....
Sundries.....	.....	.064	.....
Total.....	\$0.978	\$1.738	\$1.284

Supplies.	Dec., 1885, to Dec., 1886.	Dec., 1885, to Dec., 1886.
	to Dec., 1886.	to Dec., 1886.
Steel.....	\$0.027	\$0.126
Explosions.....	.003	.....
Oil.....	.087	.132
Wood.....	.003	.....
Coal.....	.009	.027
Lumber.....	.007	.021
R. R. supplies.....	.015	.019
Total.....	\$0.149	\$0.325

From December, 1885, to 1886, the total labor cost was \$77,550.65, the tonnage mined being 78,590 tons. The number of days' labor was 37,319, so that 2.111 tons of ore were mined per day's labor. In 1886-87 the labor cost was \$89,938.20 on 51,901 tons of ore, the cost of supplies in the two years being \$11,683.13 and \$16,873.50 respectively. In July, 1887, the labor cost on 14,399 tons was 84.3 cents, while the total cost was \$1.204. For the first eight months of 1887 the total cost was \$2.426. The Iron River pays a royalty of 30 cents per ton. From December, 1886, to July, 1887, both months inclusive, the Florence mine, also on the Menominee range, mined 47,263 tons, at a total cost of \$82,963.39, or \$1.75 per ton, this including dead work estimated to be sufficient for getting out 80,000 tons of ore. What effect a small amount of dead work has is shown by the fact that in the month of August, 1887, the total mining cost was

90 to 95 cents a ton. The company own three-quarter interest and pays 6 cents royalty on the other quarter.

For the Youngstown mine, like the two preceding, producing non-Bessemer ores, the cost for the period of May 1 to December 31, 1886, was as follows:

Cost at Youngstown Mine.

Mining.....	\$0.778
Surface labor.....	.052
Sinking.....	.021
Drifting.....	.061
No. 1 engine.....	.143
Steam pumps.....	.034
Depreciation and repairs of buildings.....	.069
Cars, skips and derricks.....	.020
General expense.....	.040
Carts, wagons and sleighs.....	.001
Teaming.....	.002
Shaft houses and skip roads.....	.006
Boarding house equipment.....	.001
Portable machinery.....	.001
Machinery.....	.009
Wire rope.....	.001
Railway supplies.....	.002
Taxes.....	.026
Credits by explosions, steel supplies, &c.....	\$1.230
Royalty.....	\$1.15
Freight to Escanaba.....	.25
Escanaba to Cleveland.....	.85
Commission.....	1.35
Insurance.....	.05
Selling at Cleveland.....	\$3.6575
Profit.....	\$4.25
Profit.....	\$0.5025

These figures taken from the books of companies will convey a clearer idea of costs than the usual rough estimates, which are generally too low.

The Economy of Naphtha Engines.

Bearing further upon the performance of naphtha as a working fluid in engine cylinders, to which we have of late referred several times, is an article contributed a few weeks ago to our British contemporary *Industries*, by G. R. Bodmer, and entitled "Petroleum Vapor Engines." Mr. Bodmer, after a mathematical analysis by which he shows that there is nothing in the general principles applying to the action of heat engines worked by vapor to account for the superiority of petroleum spirit over steam in the matter of economy, says:

The two chief sources of loss in the production and utilization of steam power are, first, the waste of fuel in the generator, and, secondly, the condensation of steam before the cut-off takes place on its admission to the cylinder. Any marked improvement in the performance of a given engine is, in all probability, due to a reduction in one or both of these losses, and if, therefore, a motor when using petroleum spirit is more economical than when using steam under otherwise similar conditions, the natural inference would be that the generator is more efficient for the production of petroleum vapor than for that of steam, and that the initial condensation in the cylinder is less for the former than for the latter. In a small engine, such as that with which Mr. Yarrow's trials were made, there is plenty of room for improvement under both heads when working with steam. It is not at all unlikely that the boiler when used simply as a steam bath for heating the coil through which the petroleum spirit was circulated was more efficient than under ordinary conditions. Owing to the fact that only about one-ninth of the quantity of heat was required to evaporate a given weight of the fluid, the circulation in the tubes would be very rapid and favor the more effective utilization of the heat supplied; but it is probably to a reduction in the initial cylinder condensation that we must look as the chief source of improvement.

To perform a given amount of work a much greater weight of petroleum spirit vapor than of steam at the same temperature has to pass through the engine. As-

suming the efficiency to be twice as great with petroleum vapor as with steam, the proportion of the former to the latter required would be $4\frac{1}{2}:1$, the heat of evaporation being taken as one-ninth that of steam. The initial pressure of the spirit vapor is about one and a half times that of the steam at the same temperature, and, roughly speaking, therefore, with the same expansion ratio, the work done in the cylinder per stroke will be about one and a half times as great with spirit vapor as with steam, and consequently the weight of the vapor admitted at each stroke $4\frac{1}{2} \times 1\frac{1}{2} = 6.75$ times that of the steam. The surface of the cylinder walls concerned in producing initial condensation is the same per stroke in both cases, and at a given speed the time of exposure would be equal. The rate at which heat is transferred from the petroleum spirit vapor to the cylinder metal must therefore be much less than for steam, in order to account for the observed greater economy. It is well known that the rate of transmission of heat through a plate of, for instance, cast iron, from one fluid to another, varies considerably according to the nature of the latter; but no data are available on this point with regard to petroleum spirit or similar vapors. That such substances would, however, part far less readily with their heat than wet steam seems highly probable, and the film of the condensed spirit once formed upon the surface of the cylinder walls must act as an effective non-conductor, whereas a similar film of water would facilitate the transference of heat. If it be assumed that the quantity of heat abstracted by the walls of the cylinder, in a given time and for a given exposed area, with a certain range of temperature, is the same whatever be the vapor used, then there would still be an advantage in favor of the petroleum vapor, on account of the greater quantity of work done per stroke—that is to say, the condensation would be, approximately, no greater for $1\frac{1}{2}$ horse-power with vapor than for 1 horse-power with steam.

In the absence of detailed particulars it is, of course, impossible to come to any definite conclusion as to the causes of the reported superior economy of the Zephyr engine; and for this purpose it would be necessary to know, not merely the quantity of petroleum spirit circulated in the generator per indicated horse-power per hour, but also the specific volumes of the vapor at various pressures, so that the amount of condensation at any point of the stroke could be determined in the same manner as has been done in the case of steam. One other point, which very possibly tells in favor of petroleum spirit, may in conclusion be mentioned. It is very generally believed that in steam engines the re-evaporation of a film of water adhering to the walls of the cylinder, on connecting it with the condenser, is largely instrumental in cooling down the metal, and thus causing subsequent initial condensation. If we assume a similar phenomenon to occur with petroleum vapor, it is tolerably certain that the adhering film of liquid cannot be thicker than in the case of steam; and as its specific gravity is less than that of water, the actual weight of the film must also be less. The heat of evaporation, however, is only about one-ninth that of steam, so that less than one-ninth of the cooling effect occurring with steam is produced by the re-evaporation of the film of petroleum spirit on the cylinder metal, and the capacity of the latter for subsequently absorbing heat is proportionately less.

At a meeting of the board of directors of the Decatur Car Wheel and Mfg. Company, on July 28, the resignation of E. B. Tippet as vice-president and general manager was accepted.

THE WEEK.

The Memphis Bridge across the Mississippi River, according to the final decision of the Secretary of War, will have a channel span of 730 feet. Capt. Haastick, President of the St. Louis barge line says, so narrow a span will cause irreparable injury to the grain trade of the river above that point, on account of the increased cost of transportation, and that if four or five such bridges should be built between Cairo and New Orleans the Government might as well discontinue the improvement of the channel.

The progress of factory inspection in this city is not satisfactory to the Working Woman's Society. Miss Van Etten, who presided at a recent meeting, said that, as shown by the figures of Chief Inspector Connolly, only 800 out of the 12,500 factories located here have been inspected within the last three months. The remainder of the work she thinks will be done within about 30 years.

The principal manufacturers of jute bagging in the United States are said to have combined to control production, at the same time advancing prices from about 7 cents to 11½ cents per yard. The output of the mills is 50,000,000 yards, sufficient to cover a crop of 7,000,000 bales of cotton. There is no scarcity of material. Referring to this "bagging squeeze," the *New Orleans Times-Democrat* says, the result must inevitably be an enormous loss to cotton planters, unless they can devise some means of effectually dealing with the crisis, and to provide against further losses planters are told to take warning by raising the material for covering their own cotton. A jute factory in New Orleans was compelled to close for want of the raw material.

The Mexican authorities are hard at work on the banks of their side of the Rio Grande, building wing dams and willow mattresses in order to protect their territory from being washed away by the turbulent river to the same extent as it has been in former years. They advise Americans on the opposite side to protect themselves in like manner.

Commodore Sicard, Chief of the Bureau of Ordnance, reports that, so far as the work of that bureau is concerned, the new cruiser *Boston* will be completed September 1, the *Atlanta* November 1, and the *Chicago* January 1. The Bureau of Construction and Engineering are equally advanced. Secretary Whitney has given instructions for the rapid completion of the work.

The annual statement of the Bureau of Industrial Affairs of Pennsylvania, just published, shows that the coal mined in 1887 in the six anthracite coal districts of the State exceeded 33,000,000 tons, exclusive of 2,000,000 used in and about the mines, which is the largest output ever known. The number of employees is 98,840, of whom about 38,000 are actual miners. In the bituminous district there are 58,000 persons, of whom 47,089 are employed inside the mines. The average value of the coal, loaded on cars at the mines in the crude state, was about \$1.25 per ton. The value of the coke is set down at \$1.75 per ton at the ovens. The wages paid for mining averaged about 45 cents per net ton.

The newly appointed Minister Plenipotentiary from Persia to the United States will arrive at New York with his suite about the middle of August. His name is Hadji Hosseim Kouli Khan Mohamed el Vesari.

An alleged discovery of tin in the State of Durango, Mexico seems to have little foundation in fact. The president of the

St. Louis Stamping Company, some two years ago, accompanied by an expert, also by Professor Potter, of Washington University, examined thoroughly every tin mine in the State, and, after spending \$25,000, became satisfied that no profit from that source is possible. Admitting that tin exists, neither water nor coal is to be found in the district, and the nearest railroad is 300 miles distant.

The largest of three great cables for the Fifth avenue Traction Railroad, in Pittsburgh, has arrived at its destination from Robeling's, the manufacturers, in Trenton, N. J. The reel is 10 feet in diameter, 9 feet 6 inches in depth, and weighs nearly 50 tons. The wagons specially provided to receive it were double trucks on 16 wheels, and are each 12 or 13 feet in length. The axles are of steel, 4½ inches square and 5½ feet long. The total weight of the wagons alone is about 18,000 pounds. The weight of the wagons and proved to be so unmanageable that the wagons were finally abandoned.

The Reading Railroad management propose to construct two bridges across the Lehigh River at Allentown, connecting the East Pennsylvania Railroad with the New Jersey Central.

Chief Arthur, of the Brotherhood of Locomotive Engineers, has called a general meeting of that body in St. Louis on August 9. Matters of supreme importance to the Brotherhood are to be decided, among others the recent action of the St. Joseph convention of engineers, firemen, switchmen and brakemen who decided upon a plan of federation, and also on the "Q" strike.

Convicts throughout the State were interrupted in their work August 1 through the operation of the new prison bill. At Elmira 800 young men in the reformatory who had been employed on light hardware and like industries were suddenly consigned to idleness. At Sing Sing an inventory of the effects in the shops is being taken preparatory to a sale. At Albany Perry & Co., the big stove founders, are putting their shops in order, and molders claim that they will soon employ between two and three hundred more men than before.

An engineer on a ferry-boat at Philadelphia fell senseless at his lever from an attack of vertigo, and the boat was driven into the pier with a fearful shock. His only possible assistant was attending to the fires in the hold.

New Orleans expects to receive abundant supplies of cheap coal a year hence from Alabama, when the Tennessee River is more fully opened to navigation by the removal of mussel shoals.

Ex-State Senator Lew Emery, of Bradford, Pa., has large grain elevators in Northern Dakota, and a big flour mill on the St. Joe River in Michigan. Speaking of wheat-growing localities, he said: "The northwestern portion of the United States is destined to become more and more the great wheat-raising country. I have given this subject considerable attention, and have visited Russia twice. I examined the great wheat districts of the Czar's empire, and I noticed that the subsoils are about the same as those found in Northern Dakota. The major portion of the wheat crop is raised in the latitude north of 45°, and very little below this. The interior of Russia appears to me to have been at one time a vast inland sea. The peasants have cut canals through the land to the Baltic and Caspian Seas, and by the aid of the rivers we have the spectacle of vessels practically going through the land, bearing the crops of wheat to these larger outlets. The point I wish to make, however, is this, that weevils, bugs, grubs,

worms, &c., never infest the wheat in latitudes north of 45°, while south of this line the uncertainty of the crop from these causes makes wheat-growing profitless. Wheat can be raised in Dakota for 40 cents per bushel, but it cannot be done in warmer latitudes for less than 80 cents. Wheat can be successfully grown as far north as 150 miles above Lake Winnipeg. For this reason, I think, wheat raising will be given over to the farmers of the Northern United States sooner or later."

The introduction in this country within the last four years of the "Hungarian process"—that is, the use of rolls in flour manufacture, enabled mills to nearly double their capacity, at the same time stimulating the building of new and extensive mills, so that profits have been as low as 2½ cents per barrel, and are still on a very narrow margin.

All the American consuls in Italy will be represented at a meeting to be held in Milan this month, to devise means for the promotion of commercial relations between Italy and the United States.

The United States Senate have adopted a resolution for the appointment of a committee to report upon the relations of commerce and business existing between the United States and the British North American Possessions. The resolution instructs the committee to inquire particularly as to the effect upon the commerce and carrying trade of the United States of the Canadian system of railways and canals.

The machinery for Mr. Spreckles's sugar refinery, in Philadelphia, will be the largest in the world of its kind, and Pittsburgh manufacturers, who are already experimenting with a large centrifugal machine under his direction, are anxious to secure a contract. It is stated that Mr. Spreckles's order for machinery, when given, will amount in round numbers to some 50 steam engines to run sets of the centrifugal apparatus. There is a possibility that this number will be increased to 100 engines.

To what extent the transactions of the commercial exchanges in Illinois may contravene the gambling laws of the State is a question that agitates the people of Chicago. The District Attorney is inclined to believe that some of them are illegal, but it is surmised that the Chicago Board of Trade will take such action as will avert the interposition of the courts.

The United States Consul, at Tokio, shows that the decline in United States exports to Japan in 1887 was almost solely due to the falling off in the exports of kerosene, and intimates that the deficiency could be fully made good by preparing expressly for that market a class of cheap cotton goods weighing 9, 8, 7 and even less pounds to the piece, now supplied almost exclusively by England, as are the cheap woollens, only to a less extent.

The Washington ordnance factory is being worked up to its full capacity. A second 10-inch gun is now ready for testing and a third will be finished before winter, in addition to 30 or 40 6-inch rifles, of which about one-third are practically finished. The chief interest centers just now in two steel-cast guns in process of completion, departures into a new field. One of these is made of Bessemer and the other of open-hearth steel. The former is the more advanced, having been fully rifled and so far completed that it is likely to be ready for trial by September. This gun is the one made by the Pittsburgh Company, and cast last January. Superintendent Hainsworth not only at that time, but after its rough boring, and indeed through every process pronounced it a most successful example of what could be

done by casting. The test by firing will be watched with eagerness, as steel-cast guns can be furnished far more cheaply than built-up guns. The cost of a built-up 6-inch breech-loader, which weighs 11,000 pounds, is about \$7750; that of an 8-inch breech-loader, weighing 28,850 pounds, is about \$16,880; that of a 10-inch gun whose weight is 57,485 pounds is \$20,420.

Railway extension projects are active in the far northwestern country. Aside from the talked-of arrangement between the Manitoban Provincial Government and the Northern Pacific Railroad Company, there is a scheme on foot to build a road through the Great Bend country on the Columbia River, to connect the Northern Pacific and the Canadian Pacific lines. Also a line from Billings on the Northern Pacific northward to the Canadian Pacific, via Fort Benton; the portion from the fort northerly to be built with Canadian capital, with Sir A. T. Galt, of Montreal, at the head of the enterprise. He sailed for England on Saturday to secure aid for the project.

A large steamship has just been built in Sheboygan, Wis., nine-tenths of the timber of which came from Arkansas and Kentucky. Far-seeing men have long felt confident that the forests of the South would yet become one of the greatest sources of wealth to that section of the country, but few persons, probably, have ever expected to see a steamship built on Lake Michigan with Southern timber as early as 1888.

It does not yet appear that the Baltimore and Ohio Railroad is sure of getting into New York by way of the Reading and Jersey Central. In any event it is said that existing traffic arrangements in which the trunk lines are concerned will not be disturbed.

The total valuation of taxable real estate in Brooklyn this year, as shown by the assessment lists, is \$385,904,988, an increase of \$23,738,915 compared with 1887.

The Board of Army Engineers in New York is expecting soon to receive from Congress the plans for the proposed Hudson River Bridge for their examination and approval.

The Northern Pacific Railroad, according to the terms of agreement now published, has secured a foothold in Manitoba, and will construct branch lines in the province, maintaining the maximum rate for what and certain other classes of freight to Duluth, which rate, however, is considerably lower than that of the Canadian Pacific. The Government is to guarantee \$6000 per mile at 5 per cent. for 25 years. The Legislature will meet August 28 to sanction the agreement.

The opening of the Australian exhibition at Melbourne, 1st inst., was witnessed by 7000 persons.

The increase of traffic at Superior City taxes to the utmost the facilities at command for handling coal and merchandise, but costly improvements at that point in the shape of dock and warehouse accommodations will soon afford a measure of relief. Over 350,000 tons of coal and merchandise have been received this season at the docks of Superior up to the present date, and 2,148,233 bushels of wheat have been shipped from the elevators.

Consul General Cardwell, at Cairo, in Egypt, reflects the widespread desire of merchants there for the establishment of direct steam communication with the United States. American petroleum was for many years almost driven from the East by the Russian product, supplied at a lower price; but the superiority of the former assists it, and the ground lost is

steadily being regained. Of American canned goods a large supply comes Eastward from English shippers; hence they are accredited in trade as English goods. American vegetables, fruits and meats are sold everywhere in Egypt and the Levant, and so is American bacon and lard, all shipped from Liverpool and London, and set down in the trade reports as English products. Is it not reasonable to presume that Egypt could be supplied by direct shipments from home more cheaply than from other countries where production does not satisfy consumption. Much of the product, however, thus consumed in Egypt, as in the Levant, is drawn from America, paying in its transportation Eastward probably as much, if not more, profit to the English trader than it paid the American producer and manufacturer. The trade pays English, French, Italian and other merchants enormous profits, and it sustains huge steamship companies. With the vast, varied and valuable products of the United States it is senseless to presume a profitable trade could not be established and maintained. Our products, after introduction, would be greedily sought after, and a mutuality in commerce would spring up, which, because of the desirability of things interchangeable, would last.

The official reports of the British postal service show that the Government is rapidly perfecting its parcel post connections in all directions in which there is reason to hope for an extended retail foreign trade. There is apparent on every hand an increased appreciation of the parcels post as an important agency for the promotion of trade. The United States have made good progress in this direction, and other countries are competing energetically in the same line of enterprise.

W. C. Prime, the expert fisherman and exploring tourist, deprecates the fouling of the Ammonoosuck by sawdust. "The curse of the valley," he says, is the lumberman. In one instance a floating slab caught his line, and a "leader and two flies were lost." He indignantly says: "I dare not even hope that anything will be done in New Hampshire to arrest the degradation of the mountain streams, or stop the process of cutting away the forests. Russia, with her vast territories, is far ahead of America in intelligent legislation touching forestry. In my London papers I read of her new forest laws, which are directed to the preservation of rivers in the lowlands by keeping the uplands covered with the timber. Here it does not enter the heads of legislators that populations living in Hartford and Springfield and elsewhere in the lower country along the Connecticut have any interests in the mountain countries out of which the river comes. But they have; and Government, which ought to protect the commonwealth interests, should regard the important relations of sources to river-flows. It is of primary importance to preserve the purity of great streams flowing long distances."

The contractors for building the Texas State Capitol imported stone cutters from Scotland, because the stone cutters in this State refused to cut stone quarried by convict labor, which the State had agreed to furnish.

Attorney-General Tabor, to whom the New York Prison bill was referred by the Governor for an opinion as to its legal effect, has submitted his opinion, wherein it is held that the bill applies not only to the State prisons but to the State reformatories, all local penitentiaries, houses of refuge and the State Industrial School. The Attorney-General concedes that great difficulty will be experienced in enforcing the bill so far as local penal institutions

are concerned, owing to the omission from the bill of necessary provisions to carry its apparent intent into effect.

A number of capitalists have purchased the franchises lately held by the Central Missouri Railway Company, including a bridge across the Mississippi River at Alton, 20 miles north of St. Louis, and which, from its independent position will hold the key in the Southwest. The Alton bridge will cost not over \$2,000,000.

The fiscal representative of the Intercean Railway of Mexico, extending 700 miles from Vera Cruz to Acapulco, on the Pacific, says \$10,000,000 have been obtained in England, which will nearly complete the road.

California raisins, which were scarcely known in the market three years ago, will this year amount to 1,500,000 boxes.

Cleveland, Ohio, claims a population of 260,000. Detroit talks about 255,000, as indicated by the new city directory.

An oil refining company in Pittsburgh has made a new business departure by shipping refined oil to Europe. Recently 75,000 barrels have been sold, for Germany.

The number of acres which will be forfeited by land grant railroad companies in the event of the passage of the House bill by the Senate is over 51,000,000, including over 40,000,000 acres claimed by the Northern and Southern Pacific railroads.

A "flour trust" is proposed by the Western millers, who will meet in St. Louis 31st inst. to organize.

The time of transit of mails from the post office at New York to the post office at London and Paris respectively was reduced in 1887 from two to six hours by the fastest steamers, compared with the previous year. The gain arises quite as much from the greater care to avoid delays between the docks and the post offices as from increased speed of the vessels.

It is announced from San Francisco that owing to the withdrawal of steamers now running, trade between the Pacific Coast, Australia and New Zealand will be confined to sailing vessels, by way of Hong Kong. The Oceanic Company will still continue their line to Honolulu, but two of their steamers now in the Australian line will run from San Francisco to Vancouver, B. C., in connection with the Canadian Pacific Company.

The new steel ship Corona, constructed for the Oregon Improvement Company, was successfully launched by Nefie & Levy on Saturday. The new craft is 238 feet long, 36 feet beam and 23½ depth of hold, and is intended for service between San Francisco and San Diego. The machinery will be of the triple expansion type of 1200 horse-power.

The Bussey Bridge disaster, on the Providence Railroad, cost the company \$1,000,000. Good bridges cost less than the damage caused by rotten ones.

The new Harlem Bridge is fast nearing completion. The structure is up, but the flooring is not yet put in. The approaches are partly leveled and the bridge can be made ready for use in a few months.

The Baldwin Locomotive works have just completed for the New York, New Haven and Hartford Railroad six of the largest bituminous coal locomotives ever built by them. They weigh 56 tons each, and are expected to make the run from New York to New Haven with a full express train in 80 minutes. The firm have also just completed six heavy freight locomotives, four being for the Philadelphia and Reading Railroad, and two for the Central Railroad of New Jersey. They are of the consolidation type.

MANUFACTURING.

Iron and Steel.

J. Painter & Son, of Pittsburgh, signed the Amalgamated scale last week and their immense works are now running full time in all departments. The firm manufacture principally hoop iron and give employment to about 900 men.

The Tudor Iron Works, of St. Louis, Mo., signed the Amalgamated scale on Thursday, the 2d inst. Operations were resumed in all departments on Monday, the 6th inst.

The Jackson Furnace Company, of Jackson, Ohio, have increased their capital stock from \$25,000 to \$40,000, and it is expected they will be making iron in a short time. They will use five-sixths of raw coal and one-sixth New River coke, with small quantity of lake ore and cinder, and two-thirds of native iron ore. Mr. John Bird, from the Low Moor Furnace, in Virginia, and former manager of the Sarah Furnace, of Ironton, Ohio, for Campbell's Sons, will have charge of the furnace.

Isabella Furnace No. 1, of the Isabella Furnace Company, at Etna, Pa., which was blown out on April 5 last for relining and repairs, was blown in again on Wednesday, the 1st inst.

Edith Furnace, of the Edith Furnace Company, Limited, at Allegheny City, Pa., which is at present out of blast for repairs, will be blown in again about September 15th next.

The United States Iron and Tin Plate Company, whose works are located on the Baltimore and Ohio Railroad, about 5 miles from Pittsburgh, signed the Amalgamated scale last week. Their plant is now in full operation, giving employment to about 300 men.

The Beaver Falls Iron Company, at Beaver Falls, Pa., manufacturers of sheet iron and sheet steel, have signed the Amalgamated scale and resumed operations in all departments.

A notice has been posted in the Philadelphia Bridge Works of Cofrode & Saylor, at Pottstown, Pa., announcing a reduction of 10 per cent. in the wages of all employees, to take effect on the 16th inst. Extra time will not be allowed employees, except when they are specially requested to work, and then only at their regular rate. All salaried employees will be required to be on duty each working day of the year, and when absent and not on business for the firm deductions will be made, based on their rate per month. About 500 men are affected by the reduction.

Spang, Chalfant & Co., proprietors of the Etna Iron Works, at Etna, about 4 miles from Pittsburgh, have signed the Amalgamated scale and operations have been resumed in all departments. This firm should not be confounded with the Spang Steel and Iron Company, whose works are also located at Etna. The latter firm have not signed the scale, but are operating their works full time in all departments with non-union men, having just gained a complete victory over the Knights of Labor.

The Lebanon Mfg. Company, of Lebanon, Pa., who have been awarded the contract for 20,000 tons of castings for Claus Spreckles's sugar refinery, at Philadelphia, have advanced the wages of all their employees from 5 to 15 per cent.

J. P. Witherow, engineer and contractor, of Pittsburgh, is figuring on a contract for the erection of a large steel and iron plant, at Sabinos, Mexico. The plant is to cost \$3,000,000, and will consist of two blast

furnaces, a Bessemer rail and nail-plate mill and structural iron-works. The entire structure will be made of iron, which will be made in Pittsburgh and shipped there ready for building. The financial backers of the new scheme are English and American and Mexican capitalists.

Mary Furnace, of the Ohio Iron and Steel Company, at Lowellville, Ohio, which has been idle for some weeks, undergoing repairs, was blown in on Tuesday, the 31st ult.

On Wednesday, the 1st inst., General Superintendent Wm. R. Jones, of the Edgar Thomson Steel Works, at Braddock, Pa., had the satisfaction of seeing another of his inventions in successful operation. The contrivance is a metal-mixer, and its work is to mix the iron as it comes from the furnaces, thus securing iron of a uniform quality for use in the converter. By its use a more uniform grade of steel will be produced and very little scrap will be made.

The Aetna Iron and Steel Company, of Bridgeport, Ohio, signed the Amalgamated scale last week, and resumed operations in all departments. The firm manufacture sheet iron and sheet steel almost exclusively, and give employment to about 700 men.

The foundations for the hot-blast stoves, furnace stack and draft stack of the blast furnace at West Duluth, Minn., are about completed. The size of the furnace will be 75 x 16 feet. At West Superior, Wis., across the bay from West Duluth, a pipe foundry has been laid out and the erection of the walls has been put under contract. The initial capacity of this foundry will be 50 tons per day.

During the month of July the blast furnace of the Belmont Nail Company, at Wheeling, W. Va., produced 3525 tons of Bessemer iron.

The Pottstown Iron Company's steel mill, at Pottstown, Pa., has suspended operations for an indefinite period, owing, it is said, to the depression of trade. About 250 men are out of work.

The blast furnace of the Bellaire Nail Works, of Bellaire, Ohio, is still keeping up its remarkable work. For the month of July just closed it produced 4200 tons of Bessemer iron.

Pennsylvania Furnace, in Centre County, Pa., recently operated by the Centre Mining Company, Limited, which was blown out on May 23, will not again be started, as it is unprofitable to run it. The stack is 44 feet high by 10½ feet in diameter at the bosh, and was changed from charcoal to coke in 1881.

Benwood Furnace, at Martins Ferry, Ohio, owned and operated by the Benwood Iron Works, of Wheeling, W. Va., which has been undergoing repairs for some time, was put in blast on Thursday, the 2d inst.

Last week Riter & Conley, of Pittsburgh, shipped to Memphis, Tenn., a steel water tower of large proportions. It was 160 feet high and 26 feet in diameter, and will rest on a stone foundation laid 20 feet under the ground, and will be secured to it by 20-inch steel I-beams. The total cost of the tower was \$36,000.

Fayette Brown, who, under authority and orders of the U. S. Circuit Court, controls Brown, Bonnell & Co.'s iron works, at Youngstown, Ohio, started the plant in operation on Wednesday, the 1st inst.

The Helmbacher Forge and Rolling Mills Company, of St. Louis, are engaged on the forgings for two large cotton compresses, and in the railway axle department are running three hammers. The company say business is seasonable with

them, but complain that prices are very low. Their establishment is not affected by the wages dispute.

Graffton Furnaces, at Leetonia, Ohio, owned by the Graffton Iron Company, but operated under lease by Graff, Bennett & Co., of Pittsburgh, have been leased by W. D. McKeefrey, a well-known iron man of Sharon, Pa., in connection with W. D. Hofins, of Sharpsville, Pa., under the firm name of McKeefrey & Hofins. One furnace will be put in operation at once.

The Fred. J. Meyers Mfg. Company, Covington, Ky., have, among other large contracts, recently secured that for all the ironwork and railing for the new court house being erected at Topeka, Kan. A large number of local contracts have also been secured, and all departments, ironwork as well as hardware specialties, are being operated to their full extent.

The South Pittsburg Pipe Works, South Pittsburg, Tenn., have completed a second pit, and are intending to build a third. They are now making 35 tons of pipe per day.

Alex. Laughlin & Co., engineers and contractors, of Cleveland Ohio, have closed a contract with Kelly Nail and Iron Company, Ironton, Ohio, for two regenerative gas heating furnaces, with working hearths 7 x 16 feet, and four three-hopper batteries of their improved steam blast gas producers. This plant will be an exact duplicate of the one now being erected by the same firm for the Belfont Iron Works, and will be used for heating muck iron and steel slabs for the nail-plate train.

The Findlay Rolling Mill Company, of Findlay, Ohio, who also own and operate the works of the Briggs Iron and Tool Company, at the same place, have just purchased the works of the Sterling Chain Company, at Cuyahoga Falls, Ohio, and will remove them to Findlay at once and get them into shape to make chains by August 15 next. The works will have a capacity of 10 tons per day and will employ between 80 and 90 men.

A syndicate has been formed to build two furnaces, and money is deposited, location selected on lands donated by Bessemer Land and Improvement Company, at Bessemer, plans adopted and work begun on tramways, foundation, &c., by the Bessemer Iron and Steel Company, H. F. De Bardeleben, president, and Charleston, Savannah and Alabama capitalists. The capital is \$1,500,000, and furnaces are to be 17 x 75 feet, exact duplicate of De Bardeleben Coal and Iron Company's furnace now in operation. This syndicate bought large bodies of ore lands in Murfree's Valley, coal lands in Cahaba Valley, including the Henry Ellen coal mines.

The large coke furnace of the Gadsden-Alabama Furnace Company, at Gadsden, Ala., is expected to be ready to go in blast about September 1.

The Belleville Nail Company, of Belleville, Ill., have increased their capital stock from \$100,000 to \$300,000, and changed their name to the Waugh Steel Works.

Bear Springs charcoal furnace, near Dover, Tenn., was blown in on the 24th ult.

The Little Belle Iron Company has been organized, and will build a charcoal furnace 12 x 60 feet, with an estimated capacity of 60 tons, at Bessemer, Ala. The capital is \$200,000. The president is H. F. De Bardeleben, of Alabama; vice-president, M. E. Lopez, of South Carolina; board of directors, E. A. Burke, Bessemer, Ala., and J. N. Carpenter and R. F. Learned, of Natchez, Miss. The Bessemer Land and Improvement Company donated

ten blocks of ground for location. Surveyors are at work, plans adopted and the furnace to be finished within 14 months.

A dispatch from Bellefonte, Pa., under date of the 2d inst., reads as follows: "The injunction served on the Howard Rolling Mill and Furnace Company at the instance of Gen. Simon Cameron last week has been set aside by the court. The machinery, therefore, will be shipped to Lockport, Ill., as soon as available."

M. V. Smith, metallurgical engineer, of Pittsburgh, has just closed a contract for the erection of a regenerating gas furnace for J. H. Sternbergh, formerly of Reading, Pa., who is now erecting a bolt works at Kansas City, Mo. The ironwork for this furnace will be furnished by Sterrit & Thomas, proprietors of the Vulcan Foundry, at Pittsburgh, while Welsh, Palmer & Maxwell, also of that city, will furnish the fire-brick for the same.

Owing to the depression in the iron trade, the Logan Iron and Steel Company, of Lewistown, Pa., have suspended a number of workmen for an indefinite period. Since the latter part of June the firm have been operating their puddling department single turn.

At a recent meeting of the stockholders of the Scottdale Iron and Steel Company, Limited, of Scottdale, Pa., the following board of managers was elected, to serve for one year: J. R. Stauffer, P. S. Loucks, Thos. Termant, Clark Grazier, W. N. Taylor, J. W. Ruth and W. N. Porter. At a subsequent meeting of the managers P. S. Loucks was elected president, J. R. Stauffer treasurer and Clark Grazier secretary. The company are in first-class financial condition, and prospects are bright for continued operation of the works.

The Trumbull Iron Company, of Girard, Ohio, are putting a new 3-high muck train into their rolling mill, and making other preparations for a good run when the works start up again. This will probably occur on the 6th of August, the wages question having been settled. The company expect to increase their output very considerably during the coming year, the prospects in their line now being most excellent. They make a specialty of small irons and special shapes for the agricultural implement trade. George F. Russell, whose headquarters are at the Grand Pacific Hotel, represents this company in Chicago.

The Kansas City (Mo.) *Commercial* is authority for the statement that a large rolling mill will be located in Armourdale in the future, but the names of the capitalists backing it have thus far been withheld from the public. The plant will employ about 250 men, and a large amount of capital will be invested in it. It will be located at the foot of Thirteenth street and Pony avenue, on the line of the Belt Line road. The ground secured for the plant extends back to the Kaw River. It is rumored that the new company have purchased much of the machinery of the old Rosedale rolling mills. The machinery is very valuable, and has been carefully guarded for five or six years, or ever since the Rosedale rolling mills went into bankruptcy.

Machinery.

The Hill Clutch Works, of Cleveland, Ohio, manufacturers of friction clutches and power transmission machinery, are running full force in all departments night and day. Among recent contracts for complete plants of machinery they report the following: Oakland, Cal.; Canton, Ohio; Des Moines, Iowa; Lawrence, Kan.; Ionia, Mich.; Crawfordsville, Ind.; St. Paul, Minn.; Pittsburgh, Pa.

The Bignall & Keeler Mfg. Company, of St. Louis, Mo., have plenty of work, and have begun to run over-time. They are working on a cotton-gin-saw ginning machine, a new invention which they are manufacturing for J. G. Falls & Co., of Memphis, Tenn. They have also completed a large pipe machine for some mining works, at Ishpeming, Mich.

Nicholson & Waterman, of Providence, R. I., have recently furnished the Rhode Island Locomotive Works, of Providence, a complete outfit of their special machinery for finishing bolts and nuts, and are now building for Armington & Sims Engine Company, also of Providence, two boring mills and three 32-inch lathes. They recently furnished a 32-inch and a 16-inch lathe to James Rees, of Pittsburgh, Pa.

Chas. A. Schieren & Co. report recent sales of their leather link belting to the following: Morrison Bros., Mt. Olivet, Ky.; Waterbury Buckle Company, Waterbury, Conn.; L. M. Rumsey Mfg. Company, St. Louis, Mo.; Goodyear Rubber Company, Milwaukee, Wis.; Arkansas Oil and Compress Company, Texarkana, Ark.; Jas. S. Senior, Little Falls, N. Y.; Geo. F. Patterson & Co., Baltimore, Md.; M. Hagarty & Co., West Bay City, Mich.; W. A. Strayer, Canton, Ohio; Bonnett Bros., Louisville, Ohio.

The Dean Bros. Steam Pump Works, Indianapolis, Ind., are operating their works to their full capacity. Among their more recent and large contracts are a complete outfit to supply water to the city of Marion, Ind., having a capacity for pumping 3,000,000 gallons per day. A large Duplex pump, with a capacity for pumping 500,000 gallons per day, was shipped to the Ashland Iron Works, Ashland, Wis.; also one Duplex, with a capacity for 1,000,000 gallons, to the Franklin Iron Works. In addition a large number of orders for smaller sizes have been filled and still remain on their books.

Hardware.

The works of the Braddock Wire Company, at Rankin Station, Pa., manufacturers of wire rods, plain and barbed wire, have been closed down for the past few weeks for the purpose of making extensive repairs in the rod mill. Operations will be resumed in full in the course of a few days. The company have recently very largely increased their capacity for the manufacture of barbed fence wire, and in the future will manufacture the genuine Glidden two-pointed barb wire. They report business very good, with plenty of orders on hand.

A company are being organized at Fort Worth, Tex., by W. F. Lake and others, for the purpose of manufacturing barbed wire. They will have a capital of \$50,000.

The new works of the Bryden Horse Shoe Company, at Catasauqua, Pa., are being rapidly pushed to completion. The works are eligibly located near the rolling mill of the Catasauqua Mfg. Company, and with switches running into their yards, connecting them with the Lehigh Valley, the Jersey Central and the Catasauqua and Fogelsville railroads. The new buildings, which are large, light and airy, will be filled with the most improved machinery for making horseshoes under the many patents owned by the company. The new works will be started up before the old works are abandoned, so that there will be no stoppage in the filling of orders. While the new plant will have a capacity to turn out at least four times the present output, the company still have ground sufficient to quadruple the capacity of their new works, and if the business increases in the future as it has in the past they will need it before many years.

Miscellaneous.

Among recently authorized corporations in Illinois are the following: The Glover & Chandler Steam Logger Company, of Chicago; capital, \$500,000; incorporators, Thomas J. Rodman, William H. Cook and John Marr. The Chicago Horseshoe Company, of Chicago; capital, \$1,000,000; incorporators, James W. Fernald, Edward L. Lamb and Robert L. Atkins. The R. J. Douglas Company, of Waukegan; capital, \$100,000; for the manufacture of boats of all kinds; incorporators, Robert J. Douglas, Miles G. Nixon and Ashley B. Palmer. The Standard Metallic Packing Company, of Chicago; capital, \$150,000; incorporators, William L. Calkins, Charles B. Coventry and Albert D. Lewis.

The capital of the Clinton Woodenware and Match Factory, at Clinton, Iowa, has been increased from \$20,000 to \$50,000, subscribed by Chicago, Philadelphia, Buffalo, St. Paul and Minneapolis parties. A stone factory will be erected, and the Fyson fusee match, now imported, will be manufactured. One hundred hands will be given employment the year round.

The American Enamel Company, Limited, of Beaver Falls, Pa., whose business is the manufacture of enameled advertising signs, street names, &c., are negotiating for the lease of another building at New Brighton, Pa., about two miles from their present location, with a view of increasing their business, which has already assumed large proportions.

Oil for Fuel.

Dr. C. B. Dudley, chemist of the Pennsylvania Railroad, in a lecture delivered before the Franklin Institute early this year, formulates the following conclusions on the use of oil for fuel:

The difficulty in regard to burning oil successfully has been overcome. Two other powerful difficulties still remain—increased cost for the same amount of heat and limited supply, and it is for the future to determine whether either of these difficulties can be overcome. As to the possibilities of the future it is difficult to say a great deal, but there certainly is very little hope for fuel oil as long as efforts are made to diminish production. It is possible, however, we think, that with present reduction, a limited amount of, say, 10,000 or 15,000 barrels per day of oil might be used to advantage as fuel, but it would probably require changes in the method of distillation with the idea in mind of making a fuel oil and possible changes in the methods of utilizing the heat generated, as has already been described, to get economy even in this limited way. There is also the rather paradoxical statement that those points furthest away from the oil fields can probably use oil to advantage, when it could not be used to advantage in the oil field itself. This is due to the fact that the same heat-producing power weighs less with oil than with coal, and consequently the freight, which is an important element always in the cost of fuel, would be in favor of the oil. In our judgment the future of fuel oil in this country, and until some other very much greater sources of supply are discovered, is in the hands of the refiners. By shaping the distillation in such a way as to produce a fuel oil at low figures, it can be burned, otherwise not.

Four hundred miles at a speed of nearly 1 mile a minute is the record which has been made and which it is proposed to maintain on rival English roads competing for passenger traffic for their Edinburgh expresses.

The Iron Age

New York, Thursday, August 9, 1888.

DAVID WILLIAMS, - - - PUBLISHER AND PROPRIETOR.
CHAS. KIRCHHOFF, JR., - EDITOR.
GEO. W. COPE, - - - ASSOCIATE EDITOR, CHICAGO.
RICHARD R. WILLIAMS, - - HARDWARE EDITOR.
JOHN S. KING, - - - BUSINESS MANAGER.

The Cheapest Pig Iron in the World.

During the past few years we have repeatedly heard enthusiastic promoters boldly claim for their favorite locality low costs of production, rounded off with the final statement, "We can beat the world." Of course every one familiar with selling prices abroad would hardly think it worth while to correct such assertions, yet we question whether many ironmasters even are aware how low pig iron is being produced in some localities abroad. We believe that the distinction of having the lowest record of cost belongs to the Ilse Works at Grossilsede, Germany. The figures have been lately published by Fritz W. Luermann, a very well-known engineer, in *Stahl und Eisen*, the data submitted being interesting also from a technical point of view, since they trace the effect of improvements in practice over a protracted period, both on increased product and lowered fuel consumption.

The works have three furnaces equipped with Gijers stoves, one stack always being in reserve, two blowing engines with 540 c. m. piston displacement per minute together, and three with an aggregate displacement of 1460 c. m. The heating surface of the boilers is 2053 sq. m. The ores are argillaceous and calcareous, from mines in proximity to the furnace plant, some of them being washed. Coke is produced now in 156 ovens at the furnace, the purchase of outside coke having steadily diminished since 1872, while the steam required has been raised almost entirely of late by the waste heat from the ovens, the quantity of steam being steadily decreased by improvements in machinery. The following table will illustrate this feature:

Coke Consumption per 10 Tons of Ore Charged.

Year.	Yield of ore.	Coke consumption. Kg.	Ash. Per cent.	Temperature of blast. Degrees Celsius.
1867.....	33.68	4,641	.....	.....
1868.....	35.16	4,369	.....	222
1869.....	35.15	4,271	10.00	225
1870.....	35.60	4,357	11.58	257
1871.....	35.50	4,325	13.58	296
1872.....	36.27	4,324	14.10	301
1873.....	36.96	4,561	14.17	285
1874.....	37.05	4,175	13.10	271
1875.....	37.12	4,257	12.40	307
1876.....	36.88	4,067	11.81	345
1877.....	36.75	3,967	10.30	340
1878.....	36.21	3,646	10.60	420
1879.....	36.46	3,470	10.20	402
1880.....	36.14	3,462	8.90	402
1881.....	35.68	3,441	9.50	442
1882.....	35.47	3,401	9.50	480
1883.....	35.12	3,488	9.30	452
1884.....	35.44	3,474	8.90	456
1885.....	35.77	3,234	8.78	455
1886.....	35.55	3,200	9.08	428
1887.....	35.57	3,025	8.67	453

It will be noted that while the yield of ore has remained fairly uniform, the coke consumption has declined steadily, being only 3025 kg. per 10 tons of ore smelted in 1887, against considerably over 4000 kg. during the period of 1867 to 1877.

This has been aided by a lowering in the ash of the fuel, and by higher temperatures of blast, although the latter is only now less than 850° F.

The consumption of fuel for raising steam has also shown a marked decline. In the following table the quantity of coal used for raising steam is given, with the ash contents of the same, and also the equivalent, in kilograms of coal, of the waste heat of the coking ovens required for firing, all on the basis of 10 tons of ore smelted:

Fuel used for Raising Steam for 10 Tons of Ore Smelted.

Year.	Coal used. Kg.	Ashes. Per cent.	Equivalent in coal of coke gas used. Kg.	Total fuel. Kg.
1867.....	1422	.....	.....	1422
1868.....	1188	.....	.....	1188
1869.....	1175	11.10	.....	1175
1870.....	1453	13.03	.....	1453
1871.....	1317	13.77	116	1433
1872.....	1102	14.20	350	1452
1873.....	1251	13.80	398	1559
1874.....	714	11.50	445	1159
1875.....	257	9.05	565	822
1876.....	48	9.07	656	704
1877.....	.....	8.14	638	638
1878.....	5	8.30	632	637
1879.....	.....	8.50	626	626
1880.....	.....	7.80	610	610
1881.....	14	7.70	752	766
1882.....	144	8.30	565	709
1883.....	184	8.60	503	687
1884.....	154	8.20	560	714
1885.....	11	7.80	665	706
1886.....	48	7.20	691	679
1887.....	0.5	7.42	747	747.5

These figures clearly show the effect of the substitution of waste cokeoven gas for direct coal firing, while the last column indicates the saving in fuel by improved boilers and machinery.

Turning now to the economical results, we have the following figures, which give the daily average product from year to year, in metric tons, the cost of ore, the wages, the cost of materials outside of fuel and ore, with repairs added—all on the basis of 10 tons of ore smelted, and finally the total cost per metric ton of pig iron in marks:

Costs of Ilse Pig Iron.

Year.	Daily product. Metric tons.	Cost of 10 tons of ore.				Total cost of pig iron. Marks per metric ton.
		Cost of ore.	Wages.	Matls and repairs.		
1867.....	32.7	11.05	13.85	5.20		41.96
1868.....	52.7	10.62	11.72	4.17		35.77
1869.....	61.5	12.00	12.21	4.02		35.46
1870.....	71.6	14.28	12.60	4.02		36.96
1871.....	68.4	15.72	13.59	4.71		43.90
1872.....	72.4	18.97	14.40	5.10		47.51
1873.....	74.0	20.22	16.80	6.58		64.62
1874.....	76.4	19.95	16.47	5.22		47.94
1875.....	79.4	25.42	14.68	4.01		39.04
1876.....	76.1	25.62	13.12	3.51		38.40
1877.....	84.6	25.80	11.73	3.22		29.67
1878.....	95.0	28.05	10.79	2.98		27.83
1879.....	105.0	22.67	10.15	2.90		25.20
1880.....	109.6	26.59	10.10	3.13		27.33
1881.....	115.7	25.55	10.33	3.62		27.61
1882.....	125.7	25.88	9.72	3.47		28.97
1883.....	139.0	26.00	9.78	3.50		29.38
1884.....	140.2	25.96	9.63	3.18		26.99
1885.....	143.8	24.26	9.52	3.02		24.95
1886.....	142.1	22.44	9.71	2.89		22.81
1887.....	156.2	24.18	8.79	2.42		23.01

It is a matter for regret that the cost per unit of fuel is not given. Still, as they stand the figures are highly instructive. While the cost of ore has more than doubled since 1867, the output per day has been tripled, labor per ton has declined heavily and the cost of repairs and of materials other than ore and fuel has fallen to one half. The general result is that the cost of pig has fallen from 41.96 marks per metric ton in 1869 to 23.01 marks in 1887, or, taking the mark at 24 cents, \$10.23 per gross ton in 1867 to \$5.62. It may well be questioned whether there

is any other plant in the world which produces pig iron so cheaply. It is not surprising that under the circumstances the works declared a dividend of 20 per cent., especially since the product is particularly suitable for basic steel manufacture, the iron carrying 3.22 per cent. of carbon, 2.92 per cent. of phosphorus, 2.38 per cent. of manganese, 0.049 per cent. of sulphur, and 0.108 per cent. of silicon, while the cinder analyzed 30.24 per cent. of silica, 0.82 per cent. of protoxide of iron, 11.90 per cent. of alumina, 9.81 per cent. of protoxide of manganese, 40.5 per cent. of lime and 1.9 per cent. of magnesia.

Mr. Luermann in reviewing these figures draws a comparison between the work at South Chicago and that at Ilse in favor of the latter. At Ilse the two furnaces produced in 1887 113,997 metric tons of pig iron from 320,489 tons of ore and cinder and 11 tons of scrap. Deducting the latter, the yield was 35.57 per cent., the fuel consumption being 96,961 tons of coke, showing a charge of 330 pounds to 100 pounds of coke, in spite of low blast temperatures. He cites in comparison with this South Chicago, where the yield of No. 7 was 54.3 per cent. of iron, but smelted daily only 368 tons of ore with 173.4 tons of coke, while Ilse No. 2 worked daily 443 tons of ore, consuming only 134 tons of coke. The record of Ilse stands 330 pounds of charge to 100 pounds of coke, as against 180 pounds of charge at South Chicago. We believe, however, that in the case of the former the ores were self-fluxing, while at South Chicago a considerable quantity of limestone must be added.

Settling a Labor Dispute.

Considerable food for thought can be found in the following leaf from the experience of an iron manufacturer whose success in handling men has been most remarkable. The account was taken from his own lips, but the facts have been slightly disguised so that his identity may not be too readily discovered.

In starting a new mill on a specialty he made a contract with his workmen to pay them a fixed scale of wages for a year, which they agreed to abide by, a duly appointed committee signing for them. After working very harmoniously for a few months it was discovered that a mill in another part of the country running on the same specialty were paying 20 per cent. more for the same class of work. Notwithstanding the contract which they had signed, and which still had several months to run, the workmen in the mill first referred to demanded that their wages be advanced to the same rate as in the other mill, and threatened to strike. The leader of their trades union was summoned to assist them in the expected contest. When he made his appearance on the ground he sought an interview with the manager of the company, who received him politely, showed him the contract which the men had signed, and obtained from him the assurance that such a contract would be respected, or if the men persisted in striking they would have to fight the battle alone. A committee of the workmen were called into the office, the union leader made a short statement

to them in which he clearly demonstrated that they were bound in honor to maintain their own agreement, and they yielded with but slight dissent. In the meantime the manager had carefully investigated the question of the difference in wages, and believed that the desired advance could be made without loss to the company if he could secure the co-operation of the workmen in running the mill more economically. After they had so gracefully yielded their point in the controversy the opportunity presented itself for treating the question on broad ground of fair dealing between man and man without the element of coercion entering into it. He therefore told the committee to wait a few moments, and then informed them that he had decided to give them the advance they had demanded and to waive the contract, but upon this one condition—namely, that they would agree each and all to work for the best interests of the company, saving fuel wherever it could be saved, economizing in other materials wherever possible, taking greater care not to burn metal in the furnaces, &c. It may be imagined that there was a hearty assent from the men when this "plan of campaign" was unfolded to them. They retired to their several posts apparently determined to carry out their part of the new agreement, and their good faith was shown at the end of the next month when the books of the company demonstrated that a saving in the cost of production had been effected which slightly exceeded the advance made in wages.

Now, there may be very few strikes in which the issue is so clear cut and the rights of either party are so well defined as in the case just cited, but there are undoubtedly many strikes and disagreements in which an equally satisfactory settlement to both sides could be secured if the matter were treated properly, and handled judiciously from the beginning. If in this instance the workmen had disregarded the decision and the advice of the union leader, and had determined to strike and take the consequences, the manager would, in all probability, have felt impelled to stand up for the rights of the company in the premises, and months of idleness and great pecuniary loss to both parties would have intervened. On the other hand, his unexpected action in conceding the point which his workmen could not have obtained by coercive measures prompted them to earnestly strive, so far as they could, to repay him for his expressed sympathy for and confidence in them.

The Wheat Markets.

Since the beginning of last month the weather has been so abnormally wet and cold in Europe that the yield of wheat in particular has been very much crippled. It is estimated the requirements of the European importing countries during the coming season will be 320,000,000 bushels, against a surplus of 256,000,000 in the exporting countries. As the American markets are and will be drawn upon largely, an advance has taken place in this market in December wheat, from 92½ cents on July 1 to 97½ cents on July 28. Since then there has been a temporary reaction to 94½ cents, from which it has since partly recovered.

The French wheat crop is estimated to be 35,000,000 hl. short—100 hl. equaling about 272 bushels. It is reported from there that the hay crop has been destroyed, and that peasants have been compelled to kill their animals, being unable to feed them. Corn cannot ripen, potatoes are rotting and the vintage will be inferior. The average wheat crop of Italy for the past ten years has been 132,000,000 bushels, which puts it third in rank as a wheat-producing country in Europe. The present crop is estimated at 120,000,000 bushels, while her requirements will be 140,000,000. Russia and India will probably furnish the 20,000,000 bushels that will be wanted to cover the deficiency.

The weather this month will be decisive as to the yield in the United Kingdom. While 80,000,000 bushels constitute an average yield, it has fallen as low as 60,000,000. Should it prove no greater than the latter figure this year 150,000,000 bushels will have to be imported. As far as the reports go Austria-Hungary will not reach an average wheat crop. Last year that country had an abundant yield, with a surplus for export of 20,000,000 bushels, of which 13,000,000 have been shipped. Russia is likely to have a surplus for export—how large is as yet doubtful, but the general report states that the outlook is fairly good. The incessant rains were, however, damaging the quality in a good many localities, especially in Podolia and Bessarabia. As for Germany, the floods were more extensive in Silesia than they have been for 30 years past. The same complaints reach us from Switzerland. The Netherlands and Denmark promise an average wheat yield, yet they together have imported about 26,000,000 bushels during the past ten years as an annual average. In Spain the weather has been unusually cold. Such being the outlook in Europe, all eyes are turned to the United States to India, the Argentine Republic, Chili and Australia.

In this country the wheat crop may possibly reach 440,000,000 bushels. Last year we shipped 95,128,641 bushels of wheat, against 89,204,887 in 1886, and 12,181,310 barrels flour, against 9,851,536. British India will probably harvest this year 254,000,000 bushels, which would be 20,000,000 in excess of 1887, when the surplus for export was 27,000,000 bushels. The maximum shipped thence has been about 40,000,000 bushels. Australia has 10,000,000 bushels to spare this year. Up to June the shipments to Europe in hectoliters were:

	1887-88.	1886-87.
From South Australia..	6,654,375	3,815,000
From Victoria	4,668,564	4,235,012
From New Zealand....	1,925,000	2,204,173
From New South Wales	1,613,126	2,054,095
Total.....	14,861,065	12,308,280

The Argentine Republic and Chili, taken together, may ship to Europe 6,000,000 to 10,000,000 bushels.

The weather this month in Europe, and the influence it will have on the crops in England, Russia and Germany, will probably even more decisively shape the course of values in the wheat markets on both sides of the Atlantic either way than it did in July. Meanwhile freights from the wheat exporting countries have also been looking up, and will have to be taken into account. But even if they rise still fur-

ther they will not materially check the outflow of wheat to where it is wanted, and the United States will at any rate be large exporters at prices largely remunerative to our farming population.

The July rise in Wall street has been largely in anticipation of the stimulating effect which the prospect of good prices for what wheat we export is to have upon the railroads. Discounting the future three or four months the professional speculators have given the first sign of the revival in all lines of trade which fair crops at moderately remunerative prices would have. Practically two-thirds of the whole of our winter wheat crop is secured. Spring wheat is still in a critical stage of development, and may yet be seriously damaged. Should the corn crop come up to expectations, which will depend upon the developments of the next few weeks, then we may look forward to a quickening in trade of which those engaged in hardware, iron, steel and the metals will receive a due share. As it is the situation is encouraging, but it is not yet quite beyond the range of possibly serious setbacks.

Assisted Emigration.

Word comes from Europe that the United States are about to receive a heavy accession of Italian laborers, and from the accounts given these newcomers will be made up very largely from the building trades, in this respect possibly of a quality superior to most of the Italian emigrants who have preceded them. The announcement not unreasonably excites concern on the part of those classes of artisans who are liable to feel the pressure in an overcrowded labor market. And elsewhere the question is asked whether this country has not reached the limit of safety in its assumed ability to absorb and assimilate foreign ingredients. The elements thus introduced into our social system are to a certain extent cumulative, corresponding in their effects to the workings of poisonous substances, such as lead or mercury, in the system, which, though taken in very minute quantities, finally produce violent disorder. We have an example and a warning in the anarchist outbreak at Chicago. Clearly enough America is interested to know the character of the threatened invasion of King Humbert's subjects, especially as is rumored on pretty direct authority that the Imperial Government is "promoting and financially assisting an exodus of its pauper hordes." The facts appear to be that the Italian Government, in its anxiety to architecturally renovate the ancient city of Rome, and at the same time give employment to labor, has gone to an extreme which is now naturally followed by violent collapse. The new buildings erected so far exceed in this capacity the needs of the inhabitants that those now unoccupied are sufficient to accommodate a population equal at least to one-half of the total inhabitants, who number only about 300,000 all told. The consequences are seen in ruined speculators, discharged laborers and financial disaster. The banks and Credit Foncier establishments, in their alarm, refuse to discount the paper of the contractors. The workmen, thus suddenly cut off from their resources, do not hesi-

tate to plunder the bakeries, causing frequent conflicts between the mob and police. It is in this emergency that resort is had to emigration, and the United States are expected to receive the refugees with open arms. The facts as yet are scarcely known beyond the nation boundary, owing to the strictness of the press censorship, no telegraph dispatch, it is said, having been permitted to leave the country.

New York City, to which most of the Italian emigrants are consigned, is not prepared to receive further additions. Already the local authorities are overtaxed. The Italian consul saw the wisdom of sending back within the last week 300 persons who must have become wholly dependent on charity, if indeed they were not already destitute. The whole subject is a fitting one for Congressional inquiry, and it is well that much information pertinent to the case has already been gathered, which may assist in intelligent action. It has been clearly shown in the course of this inquiry that, in defiance of our laws, contract labor is being brought to this country on a very extensive scale, a large number of men practically mortgaging future earnings to pay for advances of passage money. There can be no doubt that this system must be energetically suppressed.

In the face of low prices, and in spite of all predictions of a sorrowful ending, the Southern ironmasters go on increasing their plant. Hardly have the two furnaces at Bessemer begun work than two new coke stacks are to be begun at the same place under the leadership of H. F. de Bardeleben, to which is to be added a charcoal furnace by the Little Bell Iron Company at the same place. Cartersville, Ga., is to have two new plants, one for the manufacture of ferromanganese.

Tonnage of the Mahoning Valley, Ohio.—J. H. Sheadle, Secretary of the Mahoning Valley Iron Manufacturers' Association, has completed his tonnage report of the mills and furnaces of the Mahoning Valley for the year ending July 1, 1888. During a portion of the time many furnaces were closed down by reason of the coke strike. For the year the tonnage items were as follows:

	Tons.
Rolling-mill shipments.....	196,421
Rolling-mill receipts.....	411,848
Blast furnace shipments.....	306,757
Blast furnace receipts.....	1,182,629

During the same period the railroads represented in the Mahoning Valley were paid \$1,685,496.46 for freights. A conservative estimate of the revenue derived from the transportation of the product of these industries to the markets shows that it approximated \$1,000,000 additional. The railroads on incoming freight moved 169,451,457 tons 1 mile, and on outgoing freight hauled 158,486,179 tons 1 mile, a total of 327,937,636 tons. The tonnage of these rolling mills and furnaces for a year is equal to 62 per cent. of the railroad traffic of Texas, 95 per cent. of Georgia, 8,000,000 tons greater than that of Iowa, one and one-third times the tonnage of Vermont, and the same of Connecticut, twice the tonnage of Maine, and equal to the total tonnage of Arkansas, Oregon, West Virginia, New Hampshire and Delaware.

The fifty-second meeting of the American Institute of Mining Engineers will be held at Buffalo, N. Y., beginning on Tuesday evening, October 2, 1888.

THE AMALGAMATED ASSOCIATION.

A SKETCH OF ITS HISTORY.

As one of the best organized and most successful labor unions in this country, the Amalgamated Association of Iron and Steel Workers possesses particular interest, especially for those connected directly or indirectly with the iron and steel trades. The annual report of the Chief of the Bureau of Statistics, Hon. Albert S. Bolles, of Pennsylvania, for the year 1887 contains a history of the development of that organization by Mr. Charles G. Foster, editor of the *National Labor Tribune*, which is the official organ of the association. The report is too lengthy to be given space in full, and is naturally in some respects an *ex-parte* statement so far as its comments are concerned. We abstract from it, however, the leading historical facts and some data relating to the details of the organization past and present.

The Amalgamated Association grew out of the combination of several unions in different departments of the iron and steel trades west of the Allegheny Mountains, the most important of them being the United Sons of Vulcan, organized on the 12th of April, 1858, in a back room of a then popular hostelry in Diamond Alley, Pittsburgh, known as "Our House." The utmost secrecy was maintained, and after six months of a troubled career the effort was abandoned. It was not until 1861 that the organization was revived, Miles S. Humphries being chosen Grand Master in that year. Conditions for its growth were favorable, and in January, 1865, Mr. Humphries submitted to a conference a scale system of prices, developed from a suggestion made by Mr. B. F. Jones, of Jones & Laughlins' American Iron Works, Pittsburgh. After a joint meeting of the trade a scale of prices was adopted on the 13th of February.

Another of the iron and steel unions was the Associated Brotherhood of Iron and Steel Rail Heaters, organized in August, 1872, the first lodge being formed in 1869 at Chicago. In the first convention, in 1872, the word "rail" was dropped, and bar, plate and guide mill heaters were made eligible to membership. The brotherhood started with nine lodges, and at the second convention, held in Allegheny City, Pa., in May, 1873, it had 22 lodges. Mr. Foster adds that thereafter internal dissensions absorbed the energy that should have been devoted otherwise, and the brotherhood did not make a record for usefulness.

Yet another of the separate unions was the Iron and Steel Roll Hands' Union, organized in 1870, of rollers, roughers, catchers and hookers employed at the North Chicago mills. At a national convention held in 1873 the union had grown so that delegates were present representing 15 lodges, with a membership of 478.

The United Nailers were composed of a few local lodges without national organization. The first official action toward amalgamation was that by the Iron and Steel Roll Hands' Union at their convention in Columbus, Ohio, in April, 1874. The National Forge of the United Sons of Vulcan, held in Philadelphia in August, 1875, took favorable action, the joint Committee on Amalgamation of the Associated Brotherhood of Iron and Steel Heaters, Rollers and Roughers and the Iron and Steel Roll Hands' Union, at Indianapolis, Ind., August 7, 1875, deferred further immediate consideration of a resolution looking to the amalgamation of these two bodies, with the view to including also the United Sons of Vulcan. The action of the latter at Philadelphia was the outcome of correspondence with it, author-

ized by the Roll Hands' Union, but there was some delay because of the neglect of the National Forge to appoint a committee of conference.

At the next annual meeting the president, Mr. Harris, urged very strenuously the necessity and the advantages of the consolidation of all branches of iron and steel workers. The other organizations in interest met in the same city, Philadelphia, coincidentally. The result, however, was not as definite as it might have been, but, in correspondence subsequently held by the new president of the United Sons of Vulcan, Capt. Joseph Bishop, an arrangement was made for a meeting of committees of the several organizations at Pittsburgh, on December 7, 1875.

The result of this meeting was the formation of a constitution and by-laws for an Amalgamated Association, to be submitted to the lodges and forges, and to be then organized at a joint convention at Pittsburgh on the third of August, 1876. After a few alterations the constitution and by-laws submitted by the joint committee were accepted, the principal point being to strike out from the constitution the word "arbitration," leaving conciliation alone as the main principle to guide the policy of the organization.

Mr. Foster summarizes as follows the salient features of the first constitution thus adopted:

The Amalgamated Association claimed jurisdiction over all lodges then or thereafter to be organized as to matters of general importance relating to the welfare of the organization, its decisions thereon to be final, and to it belonged the authority to determine the customs and usages of the trades in interest. The officers were a president, secretary, a vice-president for each district, a treasurer and three trustees. Subordinate lodges could be organized upon a nucleus for each of not less than five practical iron and steel workers, each to have a corresponding representative whose duty consisted in giving a full report of his sub-lodge to headquarters on the last day of every month. Revenue was derived from the issue of sub-lodge charters, rituals, traveling cards, &c., and a quarterly tax in the discretion of the president, and a fund of 25 cents *per capita* each quarter was required to be provided as a protection against "a rainy day" of strikes and lock-outs. The convention was to be annually on the first Tuesday of August. A member in good standing desirous of migrating was entitled to a traveling or clearance card, to be issued by headquarters on request of his sub-lodge, which card was necessary to his amicable reception by other sub-lodges. A "dishonorable member" was defined as one guilty of having robbed or embezzled from a brother member, or having left in debt to a member with intent to defraud, or had fraudulently received or misapplied funds of the association, or had slandered any brother member, or had advocated division of the funds, or separation of lodge districts, or acted contrary to the established rules of the association on any question affecting the price of labor or the system of working in any district, provided this was opposed to the interests of his fellow workmen in keeping with the rules of the association. Such dishonorable member was disciplined by fine, suspension or expulsion, as determined by a vote of two-thirds of the members of his sub-lodge present at his trial.

The vice-president of a district was empowered to legalize strikes, and his duty further compelled him to furnish headquarters with complete statements of such difficulties and other grievances; but a vice-president was not authorized to legalize a strike until after thorough investigation, and all honorable means of avoidance

had been employed. An illegal strike was entitled to no aid from the common fund, nor was a member except his record was clear. The point of protection of members deemed of most importance was discharge from employment for taking active part in the affairs of the association. But a member thus discharged had to show that there was no charge of misconduct or willful neglect of his work for his own pleasure, or for attending meetings or for attending other business of the association without leave of absence from the manager over his department. In such case the association paid the discharged member a weekly allowance until a situation was procured for him.

In the course of time the methods of the association were modified and developed further, the following provisions of the latest amended constitution giving an idea of its present methods:

The president has authority to visit any sub-lodge and inspect its proceedings, and if a sub-lodge refuse to place any book or other information in its possession in his hands whenever required, he may fine or suspend the offending sub-lodge and report such action to the secretary of the national lodge, who, in turn, reports the same to the vice-president of the district and to all other sub-lodges. The president is responsible to the association in national convention for his official acts. In time of contention, also, he is the controlling power, and on important occasions has the benefit of the advisory assistance of the other general officials.

The vice-presidents are delegates-at-large to the annual convention and are the president's deputies in their respective districts, and each has three deputies who report to him every three months. Representatives to the national convention retain their representative capacity for one year, and one of these of each sub-lodge must report quarterly to the official organ of the association, the *National Labor Tribune*, all important news as to the running of their respective mills.

National conventions are held annually on the first Tuesday in June in Pittsburgh. Six weeks prior to the assembling of the convention a programme of business must be sent to each sub-lodge by the secretary of the national lodge. The convention cannot entertain any resolution bearing on a question of law or prices, except such question has been submitted previously to the sub-lodges as stated.

Revenue is provided as described in reference hitherto made to the first constitution, there having been no change in this particular.

The differences between employers and employees are provided for in various ways. In each district there is an Executive Committee, consisting of the vice-president, his deputies and the president of the lodge where any grievance may have arisen, except for the signing of the yearly scales. But no person is allowed to serve as a member of the Executive Committee who is personally or directly interested in such grievance. It is the duty of the vice-president to examine, in conjunction with the Mill Committee, into both sides of any grievance that may have arisen before calling the Executive Committee together to legalize a strike. When a strike has been legalized, the vice-president must notify the general office of the same, in writing; but no sub-lodge is permitted to enter into a strike except by the Executive Committee of the district.

Each sub-lodge must have a Mill Committee consisting of representatives of each department. It is the duty of this committee to superintend and guard the interests of the association in the several departments thus represented, and when it becomes apparent that any advantage is

being taken of the laws or of any member of the association, and the committee of the department where this occurs has failed to adjust the difficulty, then the committees of the other departments, in conjunction with the committee having the grievance, must jointly exhaust every effort with the manager of the works to settle the difficulty before reporting the case to the vice-president of the district. When the Joint Committee, after using all honorable means to bring about a settlement of the difficulty, has failed, the committee must call a special meeting of the lodges in interest, jointly, and all members of those lodges working in the mill affected must be notified by the Mill Committee to attend. At such special meeting the grievance pending must be explicitly stated by the members of the Joint Committee, and, if the Joint Committee consider the grievance sufficient, the corresponding representative of the lodge having the grievance shall, by instruction of his lodge, under its seal and in no other manner, notify the vice-president of the district or division and work shall continue until the vice-president has investigated the case. This officer, in conjunction with the Executive Committee, may declare a strike, and may also declare it at an end if the best interests of the association demand. In either case prompt report to headquarters is required, and then the president, in cases of necessity, has an opportunity to try his personal powers as a peacemaker.

Wherever practicable, steps must be taken to provide a scale of prices for every trade or calling in each district represented in the association. When it is found necessary that the scale of prices governing any department of a mill or factory needs revision such department must submit in writing to the sub-lodge the alterations desired in the scale on or before the first meeting in the month of March, and each lodge must then consider such desired changes, shall vote by ballot thereon and report the result in writing to the general office. When all desired alterations in the scales are received at the general office, which must be by the first Tuesday of April, the same are printed in a pamphlet and a copy is sent to every sub-lodge, and the action taken is carried by the delegates to the national convention. All suggestions pertaining to the scale must be referred to the wage committee, which is called together three or more days before the meeting of the convention, and, in order that this committee may act understandingly, the corresponding representative of each lodge must send to the general office, two weeks prior to the meeting of the committee, a statement giving the condition of their mill, the amount of work done the past year, the feeling of the members of the lodge regarding wages for the next year, stocks in hand, if any, and what kind, and any other information bearing on the subject.

To change the basis of any scale requires a two-third vote of all the delegates present at the annual convention. Except the scale is signed in the conference of employers and employees, three copies must be sent out to each lodge by the general secretary, and when signed one is kept by the firm, one by the sub-lodge, and the third is sent to the general office of the association. The scale, unless signed in conference, must be presented to the manufacturers for signatures by members of the mill committee representing each department of the mill one week prior to July 1, which is the commencement of the scale year, and notice be given by them that unless the scale of prices be signed on or before June 30 all departments of the mill or factory will cease work except roll turners and engineers; but when a stock of muck bar is on hand, and the company does not desire to boil iron, the finishing

mills must run on after the scale is signed, though when ready to boil every man must receive his own job, or if he does not the mill will cease work until he does.

Except on questions of wages regulated by a scale of prices, two weeks' notice is required from employers before a reduction can take place, and two weeks' notice must be given when an advance is requested. When it is found beyond a doubt that any member of the association is working below the price established by it, the men in such mill must cease work until such prices are rectified. No member of the association is allowed to change or alter rules existing in any mill before submitting the desired change to the lodge having control of the department for which the change is intended, and if a majority of all members of the lodge vote in favor of the change the mill committee must notify the superintendent before the same goes into effect.

The laws and rules inculcate sobriety while at work and attention to the interests of employers, and specify that departures from this will not be supported by the association.

An important provision of the laws is that any person employed as foreman, puddle boss, superintendent or general manager of any mill or factory, or holding any of these positions, together with a situation at any of the trades having membership in the association, shall not be eligible to or retain membership. In compliance with this rule, when a member is promoted to a boss-ship he drops his membership, it being recognized that a boss is necessarily in the interests of the employer, and the association policy opposes the individual "serving two masters," as being a bad outlook for either the one or the other.

The first boiling scale, adopted on the 13th of February, 1865, was the following:

Manufacturers.	Boilers.
8½ cents per pound.....	\$9.00
8¼ cents per pound.....	8.75
8 cents per pound.....	8.50
7¾ cents per pound.....	8.25
7½ and 7¼ cents per pound.....	8.00
7 and 6¾ cents per pound.....	7.50
6½ and 6¼ cents per pound.....	7.00
6 and 5¾ cents per pound.....	6.50
5½ and 5¼ cents per pound.....	6.00
5 and 4¾ cents per pound.....	5.75
4½ and 4¼ cents per pound.....	5.50
4 and 3¾ cents per pound.....	5.00
3½ and 3¼ cents per pound.....	4.75
3 and 2¾ cents per pound.....	4.50
2½ cents per pound.....	4.00

When it was adopted, common bar was selling at 7½ cents per pound, but in April the markets declined, falling to 3½ to 4 cents by July, which made the rate for boiling \$5 per ton. The men gave 90 days' notice to terminate the agreement, the prices having recovered in the mean while to figures corresponding with a \$1 rate for boiling. They demanded and got \$8 per ton, this rate prevailing from October, 1865, to October, 1866, when they demanded \$9, which was conceded. In December they were served with notice of a reduction of \$2 per ton, which was refused, a lockout following which lasted until May, 1867, and terminated by the manufacturers' withdrawal of the reduction.

At the close of this serious episode the boilers' organization asked for a conference with the manufacturers for the purpose of arranging a scale that would prevent further differences. This suggestion was accepted, and wages were arranged specially for the time up to the following September, upon the 15th day of which month it was agreed that a scale should go into effect. This scale provided a 25-cent reduction or advance in the price of boiling for each corresponding change of a ½ cent on card rates, the agreement to be terminated upon 30 days' notice by either party. It was in 1871 that it was decided to make the changes by tenths, a ¼ cent per pound advance or recession in the card to carry 10 cents advance or recession per

ton for boiling. Finished bar iron declined from 5 cents per pound in January, 1873, to 2½ cents per pound in the autumn of 1874; demand had dropped, and the prospects were bad. In October the manufacturers requested a conference and gave the 30 days' notice of termination of the scale agreement. They also demanded a reduction of \$1 per ton on the basis of the scale, which would have been, as they put it, a reduction of the basis. After several conferences the boilers proposed a compromise, but the manufacturers declined, and a lockout followed of five months' duration. This was brought to a close by the acceptance of the boilers' terms, and the signing of a scale that provided 10 cents per ton advance or recession with every ⅓ cent. per pound advance or recession in the price of common bar iron and the 30 days' termination clause. In October, 1875, six months after this agreement was made, the manufacturers served notice of termination and called for a conference.

The market was very much demoralized; prices were at almost any figure, except a reasonable one, and card cutting was rife. The price list had receded 2½ cents and there was no outlook that could be defined. From the date of the panic in 1873 on for several years was a period that tried men's souls and tested to the utmost the new method of the arrangement of wages. The conference of 1875 discussed means of tiding over the hard times. A special rate of wages for an especially depressed condition was the object. The manufacturers proposed \$4.50 per ton, and early in December a compromise was reached by which the rate was made \$5 until the 13th of that month and \$4.75 for the two months following. At the expiration of this arrangement, February 14, 1876, the conference conventions reconvened, but, being unable to make an arrangement, the committees separated, so utterly "at sea" that it was understood each firm was to proceed unguided and untrammelled by previous associations and restrictions. The boilers had profited by their union experience and were quick to determine that \$4.75 per ton was the lowest price they would accept. In May another conference was held, but hard times still lingered, and there was no definite conclusion, except "to agree to disagree." The workmen endeavored to have the scale non-terminable for a twelvemonth, the scale year to date from the first day of June. In pursuance of this the scale was accompanied by notice that, unless it was signed by May 31, work would cease on that date. The proposition was rejected, but after two weeks was accepted, and, for the first time in the history of this industry, there was some assurance of work continuing throughout a twelvemonth. Thus the United Sons of Vulcan scored a triumph that has remained with the organization ever since and which has been of the most material advantage to the members, to their employers and to the public, and has been one of the active factors in building a reputation for the association second to that of no other labor organization in the world.

In June, 1877, the yearly scale again went into effect; also in June, 1878 and 1879. In June, 1880, a demand was made for an advance of 50 cents per ton on the 2½-cent basis, and after a few days' stoppage the point was conceded. This scale was in operation for five years, having been re-enacted at each June conference; but in 1885 the minimum was reduced to \$5 per ton for boiling on a 2-cent card. This was changed in the scale of 1887-88 to \$5.50 per ton on a 2-cent base.

The finishers had no scale previous to the amalgamation, except a guide-mill schedule of rates, adopted on April 2, 1872. The association prepared a bar-mill scale

in 1879, which was adopted on the 17th of October of that year. The conference of the committees of the Amalgamated Association and the Manufacturers' Association adopted—June 28, 1886, at Pittsburgh—a scale of prices which included all details of boiling, muck mill, bar and nail-plate mill, guide, 10-inch, hoop and cotton-tie mills, with the different departments of nut iron, channel iron, T-iron angles, clip or wagon strap, hame iron; also plate and tank mills, sheet mills and nail cutting; in fact, all the production of the finishing departments.

Washington News.

(From Our Regular Correspondent.)

WASHINGTON, D. C., August 7, 1888.

The Senate Sub-Committee on Finance are still putting in six hours a day on their revenue reducing and tariff adjusting scheme, with at least a week or 10 days' work ahead. About as near as can be said now, the bill will not be laid before the full committee until their regular meeting next Tuesday, August 14. It is expected that it will engage attention there at least a week, and possibly two, throwing it over to August 21 or 28 before reaching the Senate.

Senator Allison says that he had expected to be able to close the discussion in two or three weeks, but from present indications it would run much longer, as the Democratic Senators intend to give the subject a very exhaustive consideration; they take the President's message and the Mills bill as their line of debate in antagonism to the Senate measure. From the outlook it will be well on toward October 1, if not later, before a vote can be reached. The record on long sessions of Congress has yet a margin of 54 days. The longest continuous sitting of Congress was the first session of the Thirty-first Congress, which met on December 3, 1849, and adjourned September 30, 1850, making 301 days. The present Congress has reached but 247 days. The partisan controversies over slavery questions leading to the passage of the fugitive slave bill and border troubles consumed the time of the national legislators during that long and weary summer sitting. The compromise tariff of 1833 had passed. In 1842, the Whigs being in power, substituted their distinctively protective tariff of that year. In 1846 that measure was supplanted by the Walker low-duty tariff. The tariff under this scheme remained operative until 1857, when a still lower cut was made. From the tariff of 1857 till the Morrill tariff of 1861, a war measure, the country has been nearer free trade than at any time since the act of 1816. There have been 11 sessions of Congress since 1789 which have sat later than August 7.

At the close of the discussion of the Senate, and after the votes shall have been taken, it would not be surprising if the two Houses should get into a wrangle, first in conference committee and then over conference reports, which might protract the tariff controversy down to the day of election in November. After that, whichever way the result may turn by the will of the people, both sides in Congress will doubtless be willing to cry quits.

The inevitable thing in the whole business is that the industrial interests of the country need not anticipate a rest from tariff agitation for at least another Congress. Should the Republicans win they will doubtless consummate their efforts to revise the tariff in the interests of American markets for American products. If the Democrats win the Mills bill will be but a stepping-stone to further pruning of the tariff schedules, and swelling of the free list. Free coal and free iron ore, and a

nominal duty on pig iron, would be the next move.

The present tariff doings in the Senate are purely the political side of the question. The economic phase will not enter into the calculations of the legislators as long as the interests of parties are at stake.

The Life of an Iron Roof.

The Cincinnati Corrugating Company have obtained some valuable information from Mr. W. A. Meninger, of Covington, Ky., who has had upward of 35 years' experience in the roofing trade in that vicinity, on the life of an iron roof. Mr. Meninger stated that in 1856 he put up a corrugated-iron roof on what was then known as the Clayton Young House, at No. 33 West Fifth street, Covington, which is now occupied by the sisters of Notre Dame as a school. This roof did first-class service and gave good satisfaction until about ten years ago, when, upon some changes being made in the building, it was taken off. The material composing it has since been sold to different parties and is now in use for covering various sheds, stables and other small buildings in Covington and vicinity. In 1861 Mr. Meninger covered the Charles Whitcomb House, adjoining the Fourth Street Presbyterian Church, with corrugated iron. This roof is doing perfect service to-day. The expense for repairs, and even repainting, has been hardly worth mentioning.

In 1863 he put a similar roof of corrugated iron on a brick building erected for Mr. George Phillips, who then owned the property, the lot being now occupied by the Fourth Street Presbyterian Church. Mr. Phillips manufactured and prepared the materials himself in his rolling mill. The building has been used as a dwelling house most of the time since then, and this roof has answered its purpose admirably. It is now in a remarkably good state of preservation, considering that it has had no attention in the way of repairing for a number of years.

Mr. Meninger also cited the history of a number of old-time iron roofs with which he is personally acquainted. The old Howe warehouse on Market space had over it for over 30 years an iron roof. After affording complete protection for this long period, and over an almost flat surface, it was removed about three years ago. The Licking Rolling Mill has a corrugated iron roof which has been on it for over 25 years, and to Mr. Meninger's certain knowledge, it has never had a coat of paint since it was first put on. The Kentucky Central Railroad shops in Covington were originally furnished with a corrugated-iron roof, which remained for over 23 years in a good state of preservation, and was only recently removed on the occasion of some repairs and changes.

Mr. Frederick Siemens, writing to the editor of *Iron*, states that in the new Siemens furnaces, introduced since 1883, which are heated by radiation, the consumption of fuel is found to be reduced to less than 8 cwt. of small coal to the ton of steel ingots produced. This saving in fuel is combined with the further advantage that the steel made is much more free from blowholes than that made in furnaces heated by contact of flame, the finished metal being therefore stronger. In the older form of open-hearth furnaces 150 charges were regularly made without a stoppage, and in the furnaces heated by radiation a much greater number of charges are made. At several works over 300 charges have been made without repairs; at one works 440 charges were made, and at another works a furnace had worked for 12 months, making two charges per 24 hours, without stoppage for repairs.

Foreign Markets.

EQUIVALENTS

	Cents.
Franc, Peseta or Lira.....	19.3
Florin (Netherlands).....	40.2
Florin (Austria).....	35.0
Milreis (Portugal).....	\$1.08
Milreis (Brazil).....	54.4
Mark (Germany).....	23.8
	Pounds.
Kilogram.....	220.5
Picul.....	134.

CHILI.

VALPARAISO, June 8, 1888.—*Copper*.—Now that the difference in price between spot and futures has ceased, the mining companies' agents have been more inclined to do business, and large sales have been made by them at gradually hardening rates. In this manner June shipments have been all disposed of, together with the major portion of July, while for August there are only buyers at lower rates. For the moment the market has consequently relapsed into quietude. Sales for the fortnight sum up 31,400 quintals, at \$28.60 @ \$30.60, \$30.25 equaling £76. 31/ with 23/6 freight. *Nitrate*.—Some 884,500 quintals changed hands at \$2.70, spot, and \$2.75, futures, 95 %, \$2.70 equaling 8/3 1/2 cwt., with 30/ freight. May shipments to Europe reached 42,000 tons, and to the United States 4500; loading June 1, 25,000 and 4500 respectively; charters, 16,200 and 4000. *Coal* is stiff, arrivals from England and Australia being delayed, and domestic production diminished, Newcastle ranging from 55/ to 37/6, and Australian 38/ to 35/, as to time of sailing. *Exchange*, 25 1/2 d.—*Weber & Co.*

EAST INDIES.

SINGAPORE, July 31, 1888.—*Tin*.—The July shipments from the Straits Settlements to the United States amounted to 300 tons, against 200 last year; since January 1 to 1150, against 2800; to England in July to 600, against 900, and since January 1 to 10,600, against 7500.—*Giffillan, Wood & Co., to Charles Nordhaus, New York, per cable direct.*

MANILA, July 30, 1888.—*Hemp*.—There are buyers at \$9.50, against \$9 same date last year, equaling 1/2 ton cost and freight £32, against £30. 8/8. Cleared for the United States since January 1, 115,000 bales, against 125,000; loading for do., 3000, against 11,000; cleared for England since January 1, 206,000, against 121,000; loading for do., 15,000, against 16,000; cleared for all other ports, 45,000, against 24,000; receipts at all other ports since last cable, 9000, against 9000; do. since January 1, 337,000, against 226,000 and 224,000 the previous two years. *Freight*, \$6, against \$5. *Exchange*, 3/5 1/2, against 3/5 1/4 last year.—*Ker & Co. to Charles Nordhaus, New York, per cable direct.*

COLOMBO, June 21, 1888.—*Plumbago*.—Has been moderately active and steady. We quote to-day per ton in rupees: Large lumps, 145 @ 160; Ordinary ditto, 125 @ 150; Chips, 80 @ 95, and Dust, 40 @ 65. Following have been the shipments since October 1, 1887: To England, 54,546 cwt.; to Marseilles 38; to Trieste, 419; to Hamburg, 6955; to Antwerp, 3189; to Bremen, 1012; to India, 82; and to the United States 98,914; together, 165,155, against 181,381 last year, 133,564 in 1886 and 131,509 in 1885. We quote *Cott's Yarn*, No. 1 to 3, 7 to 12 rupees 1/2 cwt. *Exchange* 1/4 1/2.—*Volkart Bros., through Mr. John W. Greene, Agent., 82 Wall street.*

GERMANY.

HAMBURG, July 28, 1888.—*Iron*.—The demand for Pig on the part of rolling mills has not yet increased and stocks are gradually accumulating; at the same time Iron Ore is less firm. Only the production of Bessemer Pig was diminished somewhat. The Rhenish-Westphalian syndicate still upholds the price for Pig, but at Siegen a marked anxiety is shown to sell, and this competition causes a feeling of weakness. The makers of Spiegel still have a good many orders to attend to; some have booked enough to last them for the remainder of the year. At the same time stocks are not unwieldy, so that in spite of a falling export demand the price of 56 marks per ton is kept up for 10 to 12 %. At Siegen Forge Pig may be had for 47 @ 48 marks. Bessemer and Thomas continue wanted. Luxembourg Forge Pig remains 38.70. As for the rolling mills in Rhenish-Westphalia, they are kept tolerably busy in filling domestic requirements, but absolutely nothing transpires for export, a thing leading to a good deal of complaint, but not of uneasiness, since many makers have sold at home all they can turn out till October 1. As the building season is rather lively, Beams continue selling with great ease. Boiler makers are as well looked as before, but the demand for Thin sheets is slack still. Though by no means active, the least so for export, the Wire branch seems to be of good

cheer. Machine shops, foundries and car works maintain a fair amount of liveliness. The car shops boast of three times the volume of trade they had last year. Wire Rods are selling at 121 marks, Bessemer Steel Billets at 135.—*Borsenhalle.*

RUSSIA.

ST. PETERSBURG, July 26, 1888.—*Hardware*.—Russian Hardware, Brass Goods, Glassware and China are being shipped in large amounts to Persia. This Russo-Persian trade is pushed with great vigor by Korschine & Co.; who have succeeded in opening at Teheran, the capital of Persia, a Russian exhibition of similar wares and are besides making great efforts to get the concession from the Persian Government for a railroad line to connect the southern shore of the Caspian with Teheran, a company of Russian capitalists being ready to build the same.—*Journal de St. Petersburg.*

Comparative Cost of Lighting by Electricity and Gas.

A careful test was made in October last at the Grand Central depot, in Cincinnati, Ohio, to determine the comparative cost of lighting by electricity and gas, and a summary of the result was recently published. This states that these tests were carried on for 16 days, the first eight of which were assigned to the gas company and the remaining eight days to the electric light company. The steam used for operating the elevator pumps and for heating purposes was taken from a separate set of boilers, leaving one set to be used exclusively in furnishing steam to the engines driving the dynamos, and the cost of which was:

Coke used per fortnight, including starting fires, 920 bushels, at 7 cents.....	\$65.03
Water to boilers, including waste for cleaning boilers, &c., 38,408, at 9 cents per 1000 gals.....	3.50
Wages—two firemen, one day and one night.....	24.00
Interest on investment and depreciation of boilers and fixtures.....	5.00
Total.....	\$97.53

To ascertain the cost per annum, the ratio of lighting hours which these days bear to the entire year has to be determined; both the bills for electric lighting and the lighting time table of the gas company show the dark hours of October to be one-tenth of the entire year, which, taken as the basis of calculation, make the actual cost of steam supplied by the depot company for one year \$3895. The charge for electric light, exclusive of steam supply, is based upon the weight of zinc in grammes (15.44 pounds) deposited during any interval of time, multiplied by the constant 17 grammes, the number of so-called thousand candle-power of light furnished for the interval, and for which they charge, according to their contract, 37 cents per so-called candle-power. The cost for October thus calculated was \$665.75, or total cost per annum, exclusive of steam, \$6659. The actual amount charged for 1886 by the electric light company was \$15,086, while the cost of one year's illumination of the depot—according to this list—was \$10,654. This discrepancy, as shown by the list, between the cost and the actual previous charge, cannot be reconciled by any possible change of conditions or any known method of computation, and shows that either during the test some method was successfully adopted with a view of materially reducing the apparent cost of electricity or that the charge heretofore made for an equal degree of illumination has been disproportionate to the service rendered.

The average illuminating power of all the lights used in the depot, buildings, &c., was equivalent to 185.15 lights of 16 candle-power each, or 29,624 power. The tests of the gas showed it to be of 16.94 candle-power. The total registered quantity of gas passing meters during the eight days' test was 214,700 cubic feet, of which the amount used for illuminating purposes

was 196,700 cubic feet, which cost for October \$911, or for the entire year, \$9,107.50. From the tests it follows that the same degree of illumination can lighten with gas that was given by electricity with a saving of 27.72 per cent. That using gas without limitation, affording a higher degree of illumination, the expense would be nearly 40 per cent. less than the cost of electric lighting in 1886. Apart from the cost of the light produced by the electric plant, there are other interesting facts. During the weighing of the zinc plates of the voltmeters, it was found that the diminishing plate gained in weight instead of losing, as it should if the meter is working properly, showing a reversal of current. This fact indicates a state of affairs very dangerous to the pocket of the consumer of electric light, for if the meters will work backward, they may work forward at a rate greater than that assigned by theory, and cause a registration of more light than is furnished.

Another fact is the great range in candle-power of the lights caused by a slight change in the intensity or pressure of the electric current. Thus the (D) 32 nominal candle-power lamp, having the filament at an angle of 45° to the place of the photometer bar with a resistance producing 99 volts, the current was 1.05 ampere and the candle-power was 23.94, where, with a slightly increased resistance, the current was 1.268 ampere and the candle-power 42.80. The reduction of the current and resistance diminishes the load on the dynamos and engines, prolongs the existence of the lamp, and materially diminishes the illuminating effect. If the pressure of the electric current is reduced below 99 volts the illumination produced will be greatly reduced below the standard, while the cost to the consumer may be practically unchanged. The cost is about the same for a strong as for a weak light, or while the illuminating effect steadily diminishes with use, the current to maintain its incandescence remains substantially constant, and consequently the cost to the consumer becomes greater with a lower candle-power. With the Edison light a reduced brilliancy is not accompanied by a reduction of expense, but under certain conditions of lamp and service the cost may be greater for a light of 16 candle power than for one of twice the brilliancy. Changing the position of the filament (loop) of the lamp under same conditions of current and pressure produces a reduction of 50 per cent. in the illuminating power. The most startling result of the tests, says the *Progressive Age*, is the loss of over 60 per cent. in effect between the driving engines and the lamps. In almost any other application of steam-power to useful work, the relation of the work done to the power expended in doing it must be much greater to be economical. With gas or kerosene a given consumption of illuminating substances furnishes a constant power of light, while a diminished brilliancy of light is always accompanied by a reduction in the consumption of illuminating material and a corresponding reduction of cost.

It is reported from Fall River, R. I., that a syndicate composed of three capitalists of national reputation, whose names are for the present withheld, has been looking over the field for the establishment of a big steel plant in New England, and have decided to locate in Fall River if a suitable site can be obtained. Such a site, in their opinion, is the wharf and lumber yard property of Cook, Borden & Co., on Davol street, for the purchase of which negotiations are now pending. The syndicate propose to invest \$1,000,000 in the purchase of a site, erection of a plant and development of the works, and will give employment to 800 hands when in full operation.

TRADE REPORT.

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St.,
PHILADELPHIA, Pa., August 7, 1888.

Pig Iron.—The market has shown but little change during the week, and is practically in about the same position as then noted. Good brands are still in light supply and there is a gradual movement toward somewhat higher prices, although as yet there is no quotable advance. The demand is perhaps not quite as active as it was a couple of weeks ago, as a good many orders were placed at about that time, and those who are in the market now do not fall in with the idea of paying higher prices, and are therefore either taking small lots or postponing entirely until something more definite can be learned in regard to the position. At the moment, however, sellers have the advantage, and those controlling desirable brands are getting advances varying from 25 to 50 cents above the lowest rates ruling during June and July, while those who at that time cut under the market are now pretty firm at quoted prices, and not inclined to sell for any delivery beyond September. This statement probably conveys all that can be said in favor of the market, except that stocks are light, and that the demand promises to be maintained on its present basis, with some chance of its being increased. From a buyer's standpoint, things do not appear quite so favorable. There is no improvement in the price of Finished Iron, neither is the demand of a character to cause any very hopeful feelings as regards prices, consequently the demand for an advance on Pig Iron does not meet with much response. Furthermore, Iron can be had at the old prices, providing that consumers are willing to try new brands, and while this alternative is not very readily accepted it has its influence in more ways than one. For instance, make the price of a new brand a little lower, or make the old one a little higher, and a decision will soon be reached. There are still other reasons why buyers delay placing their orders at advanced prices. Western mills just starting up have been heavy buyers during the past two or three weeks, and having placed their orders, there may be now, as there was before they shut down, more or less surplus for Eastern markets. These are points which consumers would like to see cleared up before committing themselves to an advance, especially as they see no indications of better prices for their own products. But the position is undoubtedly better than it was some time ago, although as we have tried to show, the question as regards the future is still largely in abeyance. Meanwhile, there is a disposition to look for improvement, and it would not require much to bring about results of that character. Sales during the week have generally been small lots at prices ranging from \$18 to \$19 at tide, for No. 1 Foundry; \$17 to \$17.50 for No. 2, and \$16 to \$16.25 for Gray Forge. Southern Irons neglected, but could probably be had at 50¢ to \$1 1/2 ton less than quoted for Pennsylvania or Virginia Irons.

Foreign Iron.—Prices are entirely nominal, as there is no demand at present. Asking prices are as follows: Bessemer, \$19 @ \$20, c.i.f., duty paid, and 20 ¢ Spiegel, \$26 @ \$26.50.

Blooms.—There is something of a scarcity of Nail Slabs, and while quotations are unchanged it is not easy to get prompt deliveries. Prices about as follows: Slab and Billets from \$29 to \$35, f.o.b. cars at mill, according to analysis;

Charcoal Blooms, \$52 @ \$54; Run-out Anthracite \$42 @ \$44; Scrap Blooms, \$33 @ \$35 1/2 "bloom" ton of 2464 lb. Foreign at tide, c.i.f., duty paid, \$29 @ \$30 for Nail Slabs; \$31.50 @ \$32.50 for 4 x 4 Billets, and \$35 @ \$39 for Siemens-Martin, price according to analysis, &c.

Muck Bars.—There is more inquiry, and with light offerings prices are firm at from \$27.50 to \$28, delivered, or \$26.50 @ \$27.50 at mill, according to location, &c.

Bar Iron.—There is a fair amount of business on hand, and mills are kept fully employed in one way or another without accumulating much work for later delivery. In other words, large lots are not called for, so that a continuance of the present activity can only be maintained by a steady flow of orders from week to week. In the meantime, however, there is plenty of business, with a fair probability of increasing activity as the season advances. But prices have not improved, and are hardly likely to do so until the mills get more work ahead. Hand-to-mouth business is well enough in its way, but heavy buying is indispensable to an advance in prices, hence manufacturers do not as yet feel sufficiently confident of their position to warrant them in asking more money. Still considerations are in that direction, and to that extent the outlook indicates confidence in present quotations, and hopefulness in regard to the future. As mentioned last week quotations cannot be given with much exactness as there all sorts of prices, all sorts of Iron and all sorts of orders. In a general way 1.75¢ @ 1.85¢ covers both extremes of the market, but all depends on the size of order, quality of Iron, &c. Skelp Iron is said to be a little dearer—in any case manufacturers are asking 1.82 1/2¢ @ 1.85¢ for grooved, but it remains to be seen whether buyers will respond.

Plate and Tank Iron.—There is a trifle more inquiry, and it is likely that some fair sized orders will be placed during the week. The mills have very little work on hand, however, and there are plenty of sellers at quoted rates. The outlook indicates a moderate consumption during the fall months, but no material change in prices is looked for until the volume of business assumes larger proportions. Asking rates are about as follows: Ordinary Plate and Tank Iron, 1.95¢ @ 2.05¢; Shell, 2.4¢ @ 2.5¢; Flange, 3.5¢; Fire-Box, 4¢; Steel Plates, Tank and Ship Plate, 2.3¢ @ 2.4¢; Shell, 2.7¢; Flange, 3¢ @ 3 1/2¢; Fire-Box, 3 1/2¢ @ 4 1/2¢.

Structural Iron.—The demand is rather light at present, and mills are beginning to run short of work in some of their department. Orders are chiefly for small lots, although one sale amounted to about 900 tons, delivery to be taken late in the fall. Prices are unchanged as follows: 2¢ @ 2.10¢ for Bridge Plate; 2¢ @ 2.10¢ for Angles; 2.6¢ @ 2.7¢ for Tees, and 3.3¢ for Beams and Channels. Iron or Steel.

Sheet Iron.—The demand keeps up very fairly, and while there is the usual irregularity in prices, owing to the difference in quality, good makes command full prices, which for small lots are about as follows:

Best Refined, Nos. 26, 27 and 28... 3 1/4 ¢ @ 3 1/2 ¢
Best Refined, Nos. 18 to 25... 3 ¢ @ 3 1/4 ¢
Common, 1/2 ¢ less than the above.
Best Bloom Sheets, Nos. 20 to 28... 4 1/4 ¢ @ 4 3/4 ¢
Best Bloom Sheets, Nos. 22 to 25... 4 ¢ @ 4 1/4 ¢
Best Bloom Sheets, Nos. 16 to 21... 3 1/4 ¢ @ 3 3/4 ¢
Blue Annealed... 2.8 ¢ @ 3 ¢
Best Bloom, Galvanized, discount... 62 1/2 ¢
Common, discount... 67 1/2 ¢

Merchant Steel.—Trade is beginning to improve in this department, and mills look forward to a heavy fall trade. Prices are quoted for lots from store as follows: Tool Steel, 8 1/2¢; Machinery, 7, 8¢; Crucible Spring, 4 1/2¢; Open-Hearth Ord-

nary Spring, 2 1/2¢ @ 2 3/4¢; Crucible Machinery, 5¢; Best Sheet Steel, 10¢; Ordinary Sheet, 8¢.

Steel Rails.—Only small sales are reported in this market, \$30 at mill being the usual quotation. Sales are reported to have been made in some cases at less money, but the feeling is firmer, and it is claimed that about \$30 would now be a firm quotation on the very best class of orders.

Old Rails.—Nothing doing in spot lots. Sales for delivery at mills in the interior have been made at from \$22 to \$23, which are now firm quotations, as the offerings are very light.

Scrap Iron.—Market dull, and prices irregular. Small lots of good quality command about the figures quoted below, say \$18 @ \$19 for cargo lots; \$20 @ \$21 for carload lots, delivered, or for choice \$21.50 @ \$22; No. 2 do., \$14 @ \$15; Turnings, \$13 @ \$14; Old Steel Rails, \$19 @ \$20; Cast Scrap, \$14 @ \$15; do. Borings, \$9 @ \$10; Old Fish Plates, \$24 @ \$25. Old Car-Wheels, \$17 @ \$18, Philadelphia, or its equivalent.

Wrought-Iron Pipe.—No change to note in this department. Business still continues good and prices fairly satisfactory. Discounts are quoted as follows: Black Butt-Welded 55 ¢; on Galvanized do., 45 ¢; on Black Lap-Welded, 65 ¢; on Galvanized do., 52 1/2 ¢; on Boiler Tubes, 60 ¢.

Nails.—There is some trade doing in small lots, but generally speaking trade is very dull. Price is quoted at from \$2 to \$2.10 from store, with the usual discount for carload lots.

Pittsburgh.

Office of *The Iron Age*, 77 Fourth Ave.,
PITTSBURGH, August 7, 1888.

The general industrial situation, while not improving as rapidly as could be desired, is improving nevertheless, and the outlook for a good fall trade is encouraging. Labor complications are not as numerous as they have been. With few exceptions, the Iron mills have signed the wage scale and started up, and in other branches of manufacturing there is now but little trouble between employers and employees. Iron manufacturers claim that the cost of labor is much greater here than east of Pittsburgh, and that Eastern competitors have a decided advantage over them in this respect, and this was the principal reason for a reduced wage scale.

Pig Iron.—The activity noted for some weeks past continues; there is no trouble in finding buyers for all the Iron that is being offered within the range of our quotations. Furnacemen are not as free sellers as they were a month ago; the most of those whose furnaces are in blast are pretty well sold up, and then the feeling obtains that better prices are likely to be obtained before long. Since our last report sales of Mill Irons have been made at an advance of 25¢ @ 30¢ 1/2 ton, and those furnacemen pretty well sold up are refusing to make additional sales, from which it is evident that they anticipate still higher prices. The market is in that peculiar condition now that furnacemen are more disposed to sell for immediate than future delivery, while consumers are more anxious to anticipate future than present wants. Stocks in first hands, are comparatively light, the surplus having been pretty well picked up. Some furnacemen are very confident of considerably higher prices in the near future, while others, equally well informed, are not so extravagant in their expectation. It is very generally admitted, however, that there is little or no margin for profit at present prices, and it is not

strange, therefore, that an advance is looked for. We quote prices as follows:

Neutral Gray Forge.....	\$14.00 @ \$14.75,	cash
All Ore Mill.....	15.50 @ 16.00,	"
White and Mottled.....	13.75 @ 14.00,	"
No. 1 Foundry.....	16.75 @ 17.00,	"
No. 2 Foundry.....	15.50 @ 16.25,	"
No. 3 Foundry.....	14.75 @ 15.00,	"
Charcoal Foundry.....	20.00 @ 23.00,	"
Cold Blast Charcoal.....	25.00 @ 28.00,	"
Bessemer Iron.....	17.00 @ 17.25,	"

The only sale of Bessemer Iron reported was a lot of 2000 tons at \$17.25 cash, which is the top of the market at present.

Muck Bar.—There is more inquiry and the market is firmer, in sympathy with Pig Iron. We now quote at \$26.25 @ \$26.75, cash, as to quality and delivery.

Manufactured Iron.—There is an improved demand; orders are coming forward more freely, the mills have nearly all resumed operations, and some of them are reputed as having about all they can do. No change in prices: Bars, 1.70¢ @ 1.80¢; Plates, 2.15¢ @ 2.20¢; No. 24 Sheet, 2.70¢ @ 2.80¢, all 60 days, with usual discount of 2 % off for cash. The outlook is favorable for a good fall and winter trade, and this has had considerable to do with causing the mill owners to sign the wage scale and hurry up in starting up their mills—they were anxious to hold their trade, realizing as they do that it is easier to lose desirable customers than to obtain them in these days of active and sharp competition.

Nails.—The card price remains unchanged, and manufacturers here are still refusing to cut below the card, but buyers are able to do better elsewhere, and Pittsburgh makers, owing to their refusal to cut, are doing little or nothing. We continue to quote upon a basis of \$1.90 for 12d. to 40d., 60 days, 2 % off for cash, but orders are being taken west of here as low as \$1.80 and even \$1.75, at which prices Pittsburgh manufacturers can see nothing in the business, and, as already noted, there are very few Nails being made here.

Wrought-Iron Pipe.—There is an increased demand for Pipe; some few of the mills are pretty fully employed, and while prices remain unchanged the market is firmer. It looks now as if the last half of the year would be better than the first half of the year. In addition to regular trade, which has improved considerably, natural gas companies are buying more freely, and now and again we hear of pretty good sized orders being on the market. Prices, however, while firmer, are unsatisfactory, but if the present demand continues, an advance will no doubt be established. The Manufacturers' Association will have to be revived, however, before any regular advance can be made; there has not been a meeting of the association, we believe, since last fall. We continue to quote discounts off regular list as follows: Black Butt Welded Pipe, 60 %; do., Lap Welded, 70 %; Galvanized Butt, 55 %; Galvanized Lap, 60 %; Boiler Tubes, 65 %; Casing, 85¢ @ foot, net; 2-inch Tubing, 11¢.

Old Rails.—There is an increasing inquiry, and, with light offerings, the market is firmer. We are advised of sales of 1000 tons American Tees at \$21. Some sellers are now refusing to accept less than \$21. The starting up of the mills in the Shenango and Mahoning Valleys has stimulated the demand considerably, as there are more consumed out there than almost anywhere in the country.

Steel Rails.—New business continues light, but the mill here still has all it can attend to working up old orders. Prices are still quoted at \$31 @ \$31.50, cash, on cars at mill, but it is still intimated that for a desirable order the prices quoted would be shaded. There is a possibility that the last half of the year will wind up better than the first half.

Railway Track Supplies.—No change in prices. Spikes, 2¢, 30 days, delivered; Splice Bars, \$1.75 @ \$1.85; Track Bolts, \$2.85 with Square and \$2.95 with Hexagon Nuts.

Billets, &c.—Bessemer Steel Billets are quoted at \$28.25 @ \$28.75, delivered; sale of Steel Nail Slabs at \$28.45; sales of Rail and Bloom Ends at \$17.25 @ \$18; 1000 tons domestic Bloom Ends at \$18. There has been an increased demand within the past week or two.

Merchant Steel.—There is a fair business at unchanged prices. Best brands of Tool Steel, 8½¢; Crucible Spring, 4½¢; Crucible Machinery, 5¢; Open-Hearth, 2½. Singer, Nimick & Co.'s is now a full-fledged non-union mill; the firm report that everything is running satisfactorily about the mill, many of the old hands having resumed their positions.

Old Material.—There is an increased demand for all kinds of Old Material, but prices remain unchanged. Sales No. 1 Wrought Scrap at \$19, net ton; Car Axles at \$22.50 @ \$23; Cast Scrap, \$14.50 @ \$15, gross ton; Old Car Wheels, \$20; Cast Borings, \$11.50 @ \$12; sales several thousand tons Scrap Steel at \$16.50 @ \$16.75, gross.

Chicago.

Office of *The Iron Age*, 95 and 97 Washington St., CHICAGO, August 8, 1888.

Pig Iron.—Some heavy transactions in Lake Superior Charcoal enlivened the market last week, and it is believed that by this time the majority of the large consumers of this class of Iron have covered their requirements for the greater part of the coming year. A rumor is in circulation that speculators are endeavoring to secure control of the Charcoal Iron trade, with a view to advancing prices on the remaining buyers, but the report is discredited by those in a position to be thoroughly posted. At the same time it is highly probable that the low prices on which some transactions were based will not be duplicated this season. The furnace companies are now in a position to insist on better rates and they are stiffening the views of their agents. The demand for Coke Irons is fair, but no marked activity has developed, although buyers display a little more confidence in the maintenance of prices, and anticipate their wants to a moderate extent. Much irregularity prevails in Coke Iron prices, some furnaces with well-filled order-books having advanced their rates, while others continue to name the old figures. Contracts for considerable quantities of Bessemer Iron have been taken by the Steel-Rail manufacturers, whose furnace capacity exceeds their present demand for Rails. Cash quotations are as follows, f.o.b. Chicago: Lake Superior Charcoal, all numbers \$18.50 @ \$19.50; Alabama Car-Wheel, \$26.25; Southern Charcoal Foundry, No. 1, \$18 @ \$19; Jackson County Softeners, No. 1, \$17.50 @ \$18.50; Hocking Valley, Soft Foundry, No. 1, \$16.50 @ \$17.50; American Scotch (Blackband) No. 1, \$18 @ \$18.75; other Ohio Scotch Irons, No. 1, \$17.50 @ \$18; Lake Superior Coke, No. 1, \$17 @ \$17.50; No. 2, \$16 @ \$16.50; No. 3, \$15 @ \$15.50; Southern Coke, No. 2, \$16.50 @ \$17; No. 2½ and Open Bright, \$16 @ \$16.50; No. 3, \$15.50; No. 1 Mill, \$15; No. 2 Mill, \$14.50.

Bar Iron.—The heavy orders alluded to in previous reports are understood to be still held under consideration, with a probability that they will be placed this week. The carload price of Common Iron is 1.62½¢ @ 1.65¢, half extras, f.o.b., Chicago, but an upward tendency is visible in many quarters, with mills rapidly filling up

with work from this and other sections. Store prices are not so high as they were during July, quotations now ranging from 1.75¢ to 2¢, according to quantity and quality.

Structural Iron.—Considerable business has been done in bridge material, and the demand for Beams for building purposes is steadily maintained. Gottlieb & Co. secured the contract for the Lincoln street Steel viaduct, 246 feet long, for \$35,074. Twelve bids were submitted, those naming Iron being highest. Great trouble is experienced among contractors for the erection of large buildings in getting deliveries of Steel Beams. Quotations on Mill lots are as follows: Angles, 2.20¢; Universal Plates, 2.35¢; Tees, 2.45¢; Beams, 3.40¢, all f.o.b. Chicago. From store the following rates are charged: Angles, 2.40¢ @ 2.70¢; Tees, 2.60¢ @ 2.90¢; Beams and Channels, 3.80¢.

Plates, Tubes, &c.—A good steady demand is reported for Plates, but no large contracts were made. Tubes are a little firmer. Store prices are as follows: Heavy Sheets, Nos. 10 to 14, 2.65¢; Tank Iron, 2.55¢; Tank Steel, 2.80¢; Shell Iron, 3¢; Shell Steel, 3.25¢; Flange Iron and Steel, 4¢; Fire-Box Steel, 4.75¢ @ 5.75¢; Boiler Rivets, 4¢ @ 4.25¢; Ulster Iron, 3.75¢; Boiler Tubes, 60 % and 10 % off on 2½-inch and larger and 62½ % off on 2-inch and smaller.

Sheet Iron.—A few orders have been taken by manufacturers' agents at 2.95¢, f.o.b., Chicago, for No. 27 Common, but the inquiry has not been brisk. Jobbers still quote 3.10¢ @ 3.20¢ from store for small lots of No. 27, and report an excellent demand from consumers.

Galvanized Iron.—Manufacturers' agents find a very steady trade in progress, all classes of their customers buying freely. Small lots of Juniata are quoted at 60 % and 5 % off, and Charcoal at 60 % and 10 % off.

Merchant Steel.—A very satisfactory business has been transacted in some lines, but it is reported that Sleigh and Toe Calk Steels are now selling very low, competition on this class of trade being heavy. Store rates are unchanged as follows: Bessemer Bars, 2.30¢ @ 2.50¢; Tool Steel, 8½¢ @ 9½¢; Specials, 13¢ @ 25¢; Crucible Spring, 4.40¢; Open-Hearth Spring, 2.90¢; Open-Hearth Machinery, 2.75¢ @ 3¢; Crucible Sheet Steel, 7¢ @ 11¢.

Steel Rails.—No transactions have come to light since last report, and sales of Bessemer Pig by some of the local Rail manufacturers give color to the statements made of the scarcity of Rail orders. Quotations range from \$31 to \$31.50 for orders of moderate size, while carload lots sell at \$32 @ \$35, according to circumstances.

Old Rails and Wheels.—Old Iron Rails in this market are quoted at \$19 @ \$19.50, with these prices bid for quantities, although large consumers state that they have been able to supply their needs at \$18. Old car-wheels now command \$19, sales being reported at this price.

Scrap.—Very little inquiry has been made for anything except cheapest grades of material. Mixed Country Scrap is quoted at \$11 @ \$11.50. Selling quotations for carefully selected are as follows, ½ ton of 2000 lb.: No. 1 Forge or Railroad Shop, \$16.50 @ \$17; Track, \$16; No. 1 Mill, \$12 @ \$12.50; Light Wrought, \$8; Horseshoes, \$16.50; Axles, \$22; Cast Machinery, \$12 @ \$12.50; Stove Plate, \$9.50 @ \$10; Cast Borings, \$8 @ \$8.50; Wrought Turnings, \$10; Axle Turnings, \$11.50 @ \$12; Coil Steel, \$13; Leaf Steel, \$14; Locomotive Tires, \$14.

Hardware.—The demand for Shelf Hardware continues excellent, being almost too strong for the excessively hot weather now prevailing, taxing the endur-

ance of the clerical force. Fall goods are moving very freely, but staple goods are also in constant request, orders being well distributed over the stock. In Heavy Hardware fully as much trade is being done as a year ago. Prices show very little change. Bolts and Nuts are a trifle weaker, but Wagon stock generally is very firm.

Nails.—An increased inquiry and an active demand for Steel Nails are reported by manufacturers' agents. Some of them had the best trade last week they have enjoyed for a long time. Buyers seem to have decided that prices are now low enough to take hold and they have placed some very heavy orders. The usual price paid was on the basis of \$1.75 Wheeling. Jobbers quote \$2.05 from store for small lots of Steel Nails, and \$2.50 @ \$2.60 for Wire Nails.

Barb Wire.—Nothing new has occurred in this line, trade being very quiet. Jobbers quote small lots of Painted at 3¢, and of Galvanized at 3.75¢.

Pig Lead.—Sales of over 800 tons are reported, principally of Common, at 3.90¢ @ 4.05¢. The available supply in the West is said to be limited, and as consumers are buying liberally it seems probable that spot Lead will shortly command a premium. Speculation is now also an important influence in determining values in the leading trade centers of the country.

Cleveland.

CLEVELAND, August 6, 1888.

Iron Ore.—Sales of Gogebic Bessemer are reported this week at \$5 ½ ton, and an especially rich lot is said to have brought \$5.15 f.o.b. cars, Cleveland. Menominee non-Bessemer are said to have been sold for \$4, although the report lacks verification. The tendency of the market is certainly toward higher prices, however, and all Ores in any demand whatever command better figures than prevailed two weeks ago. Lake freights are partially responsible, the rate from Escanaba having advanced to \$1, and from Marquette to \$1.25. The fear entertained at the beginning of the season that the mining companies would not find a market for all their Ore no longer exists. The furnace-men seem likely to require an amount of Ore considerably in advance of the contemplated output. If prevailing Lake freights could be guaranteed for the remainder of the season, operators would have no hesitancy in increasing the forces at the mines. The best authorities estimate the sales to date at 3,000,000 tons, the actual transactions probably exceeding that figure by a few hundred thousand tons. Quotations are:

No. 1 Specular and Magnetic Bessemer Ore.....	\$5.50 @ \$6.00
No. 1 Specular and Magnetic Non-Bessemer Ore.....	4.75 @ 5.00
Red Hematite Bessemer Ore.....	4.50 @ 5.00
Red Hematite Non-Bessemer Ore.....	3.50 @ 3.75
Menominee Range Bessemer Ore.....	4.75 @ 5.10
Menominee Range Non-Bessemer Ore.....	3.50 @ 3.75
Gogebic Range Bessemer Ore.....	4.75 @ 5.15

Pig Iron.—The market continues to improve in tone. Buyers are purchasing freely, not only the amount of Pig Iron needed for immediate use, but quantities sufficient to cover all positive future needs. They are possibly inclined to move thus vigorously because prices are low, and sellers are disinclined to ask for an advance. If the present demand continues it may be found necessary to make higher quotations. Charcoal Irons in all numbers are selling freely, and Foundry Irons are eagerly asked for. The following are quotations:

No. 1 to 6 Lake Superior Charcoal.....	\$20.50 @ \$21.50
No. 1 Strong Foundry, Bessemer quality, ½ ton.....	17.25 @ 18.25
No. 1 Strong Foundry, ½ ton.....	17.00 @ 17.75

No. 2 Strong Foundry, ½ ton.....	16.00 @ 17.00
No. 1 American Scotch, ½ ton.....	17.50 @ 18.00
No. 2 American Scotch, ½ ton.....	16.50 @ 17.00
No. 1 Soft Silvery, ½ ton.....	17.50 @ 18.50
Mahoning and Shenango Valley Neutral Mill Irons, ½ ton.....	@ 14.75
Mahoning and Shenango Valley Red Short Mills, ½ ton.....	@ 15.25

Scrap Iron.—Scattering sales of Old American Rails at \$20.50 are reported. A local firm reports the sale of 500 tons of No. 1 Wrought at \$17.50.

Nails.—A few stock sales of Steel Nails at \$2, and of Steel Wire Nails at \$2.50 are reported. Iron Nails are held at \$1.90, with but little doing.

Barb Wire.—Only a few sales are taking place at 3.10¢ for Painted, and 3.75¢ for Galvanized.

Cincinnati.

CINCINNATI, August 6, 1888.

Pig Iron.—A confident feeling, increased activity and higher prices have been the features of prominence in the local Pig-Iron market during the past week. Sellers have been less anxious to sell, while buyers have been more urgent to buy. Early in the week furnaces met the advances of consumers at previous prices, but, as the week progressed, prices ruled 25¢ @ 50¢ ½ ton higher, and at the close a still further advance is asked; furnaces are disposed to withdraw from the market upon special brands, even at the higher prices asked. The volume of business has been large, and, while mainly for foundry grades, the demand for Mill Iron has been active and sales comparatively small, only on account of the difficulty in obtaining the Iron. The market has been relieved by the disposal of Mottled, Bright and various other grades which have accumulated at the furnaces for some time. Sales probably aggregated in the neighborhood of 40,000 to 50,000 tons, including all kinds, and for delivery at present and extending throughout the remainder of the year. Car-Wheel Iron has been especially active and strong, but has not advanced, as it did not decline with other Iron some time since. Among the sales during the week may be noted about 15,000 tons of No. 2 Southern Coke Foundry Iron ranging from \$15.50 to \$16, and further sales were again made to-day at the outside rate, but holders are now asking a further advance. No. 2 ½ Foundry sold at \$15, between 3000 and 4000 tons No. 1 Southern Mill Iron sold at \$14.75, and small lots at \$14.50. No. 2 Mill Iron is scarce and nominally quotable at \$14. Between 8000 and 4000 tons Hanging Rock and Southern Car-Wheel Iron sold at \$25, cash, and further sales of Lake Superior Car-Wheel Iron were made on the basis of quotations made a week ago. Mottled Iron sold at \$18, but is now held higher. Lowmoor, Va., Iron, sold at \$16.25. For several thousand tons of Open Bright Iron about \$15.25 has been realized. The stock of Soft Iron is reported to be still large and irregular in price, but even for this kind there is a much better demand.

Hot-Blast Foundry.

Southern Coke, No. 1.....	\$16.50 @ \$17.00
Southern Coke, No. 2.....	15.50 @ 16.00
Southern Coke, No. 3.....	14.50 @ 15.00
Ohio Soft Stone Coal, No. 1.....	17.00 @ 17.50
Ohio Soft Stone Coal, No. 2.....	15.50 @ 16.00
Mahoning and Shenango Valley Hanging Rock Charcoal, No. 1.....	16.50 @ 17.00
Hanging Rock Charcoal, No. 2.....	20.50 @ 22.50
Tennessee and Alabama Charcoal, No. 1.....	19.00 @ 21.00
No. 1.....	17.50 @ 18.00
Tennessee and Alabama Charcoal, No. 2.....	16.50 @ 17.50

Forge.

Strong Neutral Coke.....	13.50 @ 14.00
Mottled Neutral Coke.....	@ 13.00
No. 1 Mill Coke.....	14.50 @ 15.00
No. 2 Mill Coke.....	13.25 @ 14.00

Car-Wheel and Malleable Irons.

Southern Car-Wheel.....	20.00 @ 23.00
Hanging Rock, Cold Blast.....	22.00 @ 25.00
Lake Superior Car-Wheel and Malleable.....	20.00 @ 21.00

Manufactured Iron.—There has been no special activity in the market for Bar or Plate Iron, yet there may have been a fair number of orders and the market has ruled steady. Bar and Sheet Iron—Common Bar Iron, 1.90¢ @ 2¢; Charcoal Bar Iron, 2.90¢ @ 3¢; Sheet Iron, Boiled, Nos. 10 to 27, 2.50¢ @ 3.25¢; Sheet Iron, Charcoal, Nos. 15 to 25, 3 ¼¢ @ 4 ¼¢ ½ lb.

Nails.—There has been a little better undertone to the market, with a fair jobbing demand for all kinds. Sales of round lots are made from the mills on the basis of 15¢ lower than quotations. Jobbing prices are based upon 12d @ 40d, which sell at \$2 ½ keg, with 10¢ rebate in carload lots at mills; 50d @ 60d, 25¢; 10d, 10¢; 8d @ 9d, 25¢; 6d @ 7d, 40¢; 4d @ 5d, 60¢; 3d, \$1, and 2d \$1.50 per keg more. Steel Nails sell at \$2 and Steel Wire Nails at \$2.65 @ \$2.75 ½ keg.

Old Material.—There has been an improved demand for both Rails and Wheels, with sales of Old Rails at \$19.50 @ \$20, cash, here, and Old Wheels at \$18.50 @ \$19, but sales of the latter were made by local parties in St. Louis at \$19.50, cash, delivered from Western point.

Chattanooga.

Office of *The Iron Age*, Carter and 9th Sts., CHATTANOOGA, August 6, 1888.

Pig Iron.—The very conservative feeling that has prevailed among all the producers for the last few days is now followed by a decided stiffening up in prices all along the line. Offers for round lots, at prices that would have been taken two weeks ago, are now refused, and in some instances at least \$1 advance is asked. There has been a good deal of buying of large lots to be shipped as ordered, from which it is fair to suppose that the Iron was not for speculative purposes. There is a matter among the future possibilities which, if it should happen, will create considerable excitement in the Iron market and cause a decided upward turn in the market. Some two or three of the trunk lines leading north from the Iron producing districts of the South have declined to remain in the Southern Steamship Association, and, as it is well known that there has already been cutting in rates, it is thought by some that the time is not far off when some one of the lines will "let loose" on Pig Iron freights. Should this event take place, those who have large contracts for either furnace yard or other deliveries will, no doubt, endeavor to get the advantages of the rates.

Miscellaneous.—In the past few weeks there have been rumors of new furnace companies being organized, which are now appearing to take more definite shape, and the probability is that some 10 to 15 new plants will within the present year materialize; in fact a few of them have already gone so far as to insure their erection. A very prominent Ironmaster, who has been in the business for many years and who has always been a successful man, predicted a few days ago that within the next 10 years there would be not less than 50 new furnaces erected in the Southern States. He argues that when Ore can be put at the Tunnel Head at 75¢ @ \$1 ½ ton and a fair coking coal can be obtained within a few miles the cost of making Iron under these conditions is hard to beat.

Louisville.

LOUISVILLE, KY., August 6, 1888.

The price for all Coke Irons has advanced from 25¢ to 50¢ ½ ton, placing the West on a basis with the Eastern market, which for the last four weeks has been fully 50¢ a ton higher. There have been inquiries for round lots of Iron, and

a number of sales made in quantities of from 300 to 500 tons, though heavy purchases have not yet set in. There is a strong inquiry for deliveries running through the year and for 12 months, and it is thought that if the present tone of the market continues buyers will be generally inclined to make purchases for a year's supply. Furnaces have awakened to the fact that the market is improving, and their position is stronger than it was two weeks ago, and now are declining in many instances to sell Irons for long deliveries, but will accept orders for from 30 to 60 days. At present it is impossible to state whether there will be an advance of more than 50¢ @ 75¢ per ton, as the Western market is merely keeping pace with the Eastern, which has been rather steady for the last three or four weeks without any special advance. Rolling mills in this vicinity find the demand for Bar Iron also improved, and during the last month have made sales larger than their output, so they had to draw from stock. The car companies report improved business, and are not inclined to fight for orders as they have been during the last three or four months. Old material has slightly advanced, a very large sale of 13,000 tons of Old Rails having been reported.

Southern Coke, No. 1 Foundry	16.25 @	17.25
" " No. 2	15.25 @	16.25
" " No. 2 1/2	14.75 @	15.25
Hanging Rock Coke, No. 1 Foundry	16.25 @	17.25
" " No. 2	20.50 @	22.75
Southern Charcoal, No. 1 Foundry	17.50 @	18.00
Silver Gray, different grades	13.75 @	14.50
Southern Coke, No. 1 Mill, Neutral	13.00 @	14.00
" " No. 2	12.50 @	13.50
" " No. 1 " Cold Short	12.50 @	13.50
" " Charcoal, No. 1 Mill	13.75 @	15.00
White and Mottled, different grades	12.25 @	12.75
Southern Car-Wheel, standard brands	21.75 @	24.75
Southern Car-Wheel, other brands	18.75 @	20.75
Hanging Rock, Cold Blast	20.75 @	22.75
Hanging Rock, Warm Blast	18.75 @	19.75

New York.

Office of The Iron Age, 66 and 68 Duane street.
NEW YORK, August 8, 1888.

American Pig.—The reports of furnace agents and dealers vary considerably so far as sales are concerned. Some of them state that both inquiries and sales are heavier, and that a better feeling generally prevails. Others acknowledge that practically they have not as yet observed any marked movement, and cite instances of sales at the low figures which have been prevailing for some time. Mr. B. G. Clarke, of the Thomas Iron Company, reports that during the past week he has received inquiries aggregating 30,000 tons for Thomas Foundry and Forge Irons, 15,000 to 20,000 tons thereof being from regular customers—stove foundries, bar mills and agricultural works—who generally buy at this season of the year. It is estimated that the Thomas Iron Company have still for sale of this year's product about 60,000 tons. Ten furnaces are doing as much work and more now than 12 did a year ago, the product running up to over 15,000 gross tons per month, as compared with about 13,000 last year. We continue to quote standard to choice Northern Irons, tidewater delivery, \$18 @ \$18.50 for No. 1 Foundry; \$16.50 @ \$17.50 for No. 2 Foundry; \$15 @ \$16 for Gray Forge. Sellers of Southern Iron report but little business, some of the leading companies being sold far ahead. It is rumored that troubles in the Southern Railroad and Steamship Association may lead to an early reduction in freight rates.

Scotch Iron.—The market is very quiet, only few sales being made and those on a small scale. We quote: Coltness, \$19.50 @ \$20; Summerlee, \$19.25 @ \$19.50; Langloan, \$19 @ \$19.50; and Dalmellington, \$18.25 @ \$18.75.

Spiegeleisen.—The market is very quiet, and prices are entirely nominal at \$27 @ \$27.50 for 20 %, \$23 for 10 to 12 %, and \$39 for 45 %.

Bar Iron.—Manufacturers of special grades of iron report that the railroad companies and the locomotive shops are buying more freely, and that inquiries are growing more numerous. We continue to quote for carload lots, half extras, on dock, 1.60¢ @ 1.65¢ for Common; 1.65¢ @ 1.7¢ for Medium, and 1.75¢ @ 1.9¢ for Refined, with special qualities selling as high as 2¢ @ 2.5¢.

Plates.—With the exception of a sale of Ship Plates and of Structural material for a steamboat on a Hudson shipyard, no transactions unusual in size are reported. We continue to quote: Iron Tank, 1.9¢ @ 2¢; Shell, 2.15¢ @ 2.30¢; Steel Tank, 2.25¢ @ 2.3¢; Shell, 2.40¢ @ 2.50¢; Flange, 2.7¢ @ 2.75¢, and Fire-Box, 3.7¢ @ 4¢ in round lots on dock, American Steel exclusively. There is an active demand from jobbers for Galvanized Sheets, which we quote 65 % @ 65 & 5 % discount.

Structural Iron.—We quote: Bridge Plates, 1.9¢ @ 2¢; Universal Mill Plates, 2¢; Angles, 2¢ @ 2.2¢; Tees, 2.5¢ @ 2.7¢, and Channels and Beams, on dock, 3.3¢.

Steel Rails.—The market is exceedingly dull, no transactions of any consequence being reported by any of the leading mills. In spite of the better feeling apparently prevailing in railroad circles, the outlook is not regarded as bright, particularly for those mills in the West which depend upon the great Northwestern Railroad systems for the bulk of their orders. In the East prices remain \$29 at mill for standard sections. A meeting was held at Long Branch on the 3d inst., at which the present arrangement among the mills was continued for another year. The allotment was fixed at the same figure at which it was started a year ago, and other features of the agreement were continued, the principal changes being modifications in the percentages of the different mills. Among those present were O. W. Potter, president, and W. C. Potter, vice-president, of the North Chicago Rolling Mill Company; A. J. Leith, president, and W. R. Stirling, treasurer, of the Joliet Steel Company; J. C. Morse and Mr. Porter, of the Union Steel Company; John Walker and C. H. Odell, of the Edgar Thomson Steel Works; E. Y. Townsend, of the Cambria Iron Company; William W. Thurston and C. Linderman, of the Bethlehem Iron Company; L. S. Bent, of the Pennsylvania Steel Company; B. G. Clarke, of the Lackawanna Iron and Coal Company; Walter Scranton, Scranton Steel Company; W. Kemp and S. E. Marvin, of the Troy Steel and Iron Company, and W. Smith, of the Worcester Steel Company. The Cleveland Rolling Mill Company were represented by proxy, while Indianapolis and Springfield were not represented. The meeting was very harmonious, contrary to the expectation of some that the differences which have existed in the past would lead to some discussion.

Billets.—Importers have received a number of inquiries, chiefly in small lots and for prompt delivery, so that they have little latitude to arrange for shipments by sailing vessels. Prices of foreign material are too high to admit of much business. We quote: \$29.50 @ \$30, steamer shipment, nominally.

Wire Rods.—There are few inquiries or sales, the market remaining at \$39.75 @ \$40 for early delivery.

Axles.—Small sales only are being made in this territory on the basis of 2.15¢ for All Scrap Hammered Axles.

Fastenings.—The market is quiet, Spikes selling at \$2.05 @ \$2.10, delivered, with an additional price for any excess in

freight over 10¢. Angle Bars are 1.90¢ for Iron and 2.15¢ @ 2.20¢ for Steel.

Scrap.—Business is very quiet, there being little offering and a light demand. We hear of a lot of 150 tons of Car and Bridge Heavy Scrap offering at \$19, on barge.

Merchant Steel.—Complaints are numerous that efforts are being made by some parties in the trade to break down manufacturers' prices. The association quotations remain for 1-ton, 10-ton and 50-ton lots respectively: Tire, 2.35¢, 2.20¢, 2.15¢; Machinery, 2.40¢, 2.25¢ and 2.20¢; Toe Calk, 2.45¢, 2.30¢ and 2.25¢, and Sleigh Shoe, 2.30¢, 2.15¢ and 2.10¢; Spring Steel is quoted at 2.7¢ to consumers.

Old Rails.—We hear of two sales of 2500 tons each to an Eastern and a Western buyer at private terms. The market having gained in strength, the Western buyers are endeavoring to secure material, which is scarce. What stock there is, especially of Double Heads, is very firmly held, a considerable part of it being held on European account. We hear of offers of American Tees at \$21 on barge, which we quote.

Cotton Ties.—We are in the midst of the season and considerable business is being done. Importers quote \$1.05 @ \$1.10 per bundle of 50 pounds, delivered New Orleans or Galveston, according to time of shipment.

Bradley & Burch announce, under date of July 9, that they have begun business at Leadenhall Buildings, London, E. C., England, as Tin Plate, Iron and general metal merchants and agents. They have been appointed the London agents of John Knight & Co., of the Cookley Iron Works, Brierley Hill, Staffordshire.

We are advised by E. Bücking & Co., Walzwerk, Mulheim Rhein, that by mutual and friendly agreement Alfred Heyn has resigned as their agent, and that they have appointed Chas. G. Eckstein & Co., 32 Liberty street, New York, their representatives for the United States.

Coal Market.

The Anthracite Coal trade continues to hold a strong position, both as to prices and output, the latter being regulated by the several producing companies evidently with careful reference to the demands of consumers. During the week ending 4th inst. the production was still maintained in liberal volume, but was restricted to the extent of 70,000 tons compared with the previous week, the total being 754,883 tons, although it is still 74,000 tons in excess compared with the corresponding week last year. The decrease is about equally divided between the Lehigh and Wyoming districts. Since January 1 the production is 20,310,687, against 20,013,785 tons for the same time in 1887. Deliveries are active under engagements prior to the recent advance, but transactions based on the last circular net prices are as yet comparatively small, local dealers seeming inclined to hold off so long as the market remains as at present. It is surmised that a period of dullness may intervene after the "spurt" has subsided. Respecting tolls, &c., the Philadelphia *Ledger* says: "Some of the largest and most conservative Coal operators doubt the advisability of making any further advance in prices before October 1, and, while the Reading and one or two other carrying companies are said to be endeavoring to force an advance in tolls, others are reported to be of the opinion that the tolls are already high enough." As matters stand, production falls short of the demand for immediate shipment, especially for Eastern ports. The Philadelphia and Reading

Company for more than a week past have refused orders for shipment this month, their output up to September 1 being fully engaged. Contracts beyond that date are subject to possible changes in prices and tolls. Quotations are as follows: Wyoming Free Burning, f.o.b. at South Amboy and Weehawken, Broken or Grate, \$3.85; Egg, \$4.15; Stove and Chestnut, \$4.50; Reading Hard White Ash, Chestnut, \$4.40; Stove, \$4.50; Egg, \$4.25, and Broken, \$4.10 and scarce, but Chestnut is in better demand. The average price for Coal at the Reading mines in July was \$2.428 per ton, against \$2.319 in June. The average price of coal at five Schuylkill County collieries, drawn by lot to determine the scale of wages for July, was \$2.428, against \$2.33 in June.

Bituminous Coal has a firmer tone, and there is more inquiry. Quotations are \$3.25 @ \$3.50. Freight in New York, 75¢ @ 90¢, and discharge to Boston. The Reading Company have adopted the policy of burning only Anthracite Coal on all the passenger engines in use upon all of its Pennsylvania and New Jersey branches.

Metal Market.

Copper.—There has been little or no speculative interest in Copper either in London or here; no cable quotations came from the latter on Monday, owing to the bank holiday. On Thursday spot Chili Bars came £81. 2/6 and £81. 15/ yesterday and to-day, futures remaining unaltered, £78, while good merchantable brands, becoming more important for speculative purposes over there, advanced from £73 to £73. 10. Sales, 325 tons. Best Selected improved from £75. 10/ to £76. Here hardly anything transpired, sales being restricted to 50,000 lb, spot, at 16½¢, and 50,000 lb, November, at 16½¢, the market closing quiet, but firm to-day at above quotations. During the first 11 months of the fiscal year there were exported from the United States 22,504,785 lb of Ingot Copper, against 17,240,296 lb during the corresponding period of last year. The London *Economist* is of opinion that in trying to bring about a consolidation of the Rio Tinto, Mason & Barry, and Tharsis Copper Mining companies the French syndicate have no other aim in view than the one of facilitating the sales of the consolidated shares on the London and Paris Stock Exchanges. Meanwhile Rio Tinto shares improved in Paris 6½ francs last week. Spanish exportation of Pyrites during the first four months has been 341,009 tons, against 333,431 in 1887 and 300,562 in 1886; of Precipitate 12,026, against 11,696 and 10,660 respectively.

Tin.—The London market has been favorably influenced during the week under review by the reduced visible supply of Tin in Europe and America, which was 13,566 tons on August 1, as compared with 16,092 on July 1 and 10,528 on August 1, 1887. Spot Straits opened at £89 on Thursday of last week, and improved to £90. 2/6 yesterday, while futures rose from £89. 12/6 to £90. 10/, sales aggregating 280 tons. Although the quotations followed suit in this market, hardly any actual business was done except in a jobbing way; the tone was strong, however, at nominally 20.80¢ @ 20.50¢ on 'Change; August, 20.10¢ @ 20.30¢; September sellers at 20.40¢, and October 20½¢. This morning London is again slightly higher, spot being cabled £90. 5/ and futures £90. 15/. Our own market winds up strong, but dull, without anything transpiring in the way of sales. The import of Tin into the United States during the first 11 months of the fiscal year was 29,131,506 pounds, against 28,584,560 pounds last year, and the export 304,407 pounds, against 117,094.

According to Messrs. Giffillan, Wood & Co.'s Singapore dispatch of August 1, the July shipments from the Straits Settlements to the United States were 300 tons, against 200 in July, 1887; and to England 600, against 900. During the first seven months the Straits only shipped this way 1150 tons, against 2800 last year, but to England 10,600, against 7,500. **Tin Plates.**—The market for spot Plates remains very firm both here and in England; the future market is also higher, based on the strong statistical position and advance in prices in Pig Tin. For the present the consumption of Tin Plates is ahead of production, and so long as this state of affairs continues lower prices need not be looked for. The market closes at following quotations for large lines on the spot: Siemens-Martin Steel, Charcoal finish, \$4.85 @ \$5.25; ditto Coke finish, \$4.75; Terns, \$4.30 @ \$4.40; Bessemer Cokes, \$4.50 @ \$4.60, and Wasters, \$4.20 @ \$4.25. Coke Tins are selling at 13/3 in Liverpool, for prompt delivery. The import of Tin into the United States during the first 11 months of fiscal year has been 573,543,195 lb, against 512,251,817 last year.

Lead.—Sales were made in the open market to the extent of 1000 tons at 4.20¢ @ 4.25¢ for Common Domestic, the market closing strong at 4.25¢ @ 4.30¢. Consumers bought to a moderate extent, and the main operator has also been a buyer. From what we hear the demand for Lead manufactures has been tolerably good in July, but so far this month it is wretched once more, and in this respect the outlook for the moment is the reverse of encouraging. In London there has been no change, Soft Spanish remaining £13, and English Pig, £13. 5/. At the Metal Exchange there were sold 326 tons of Lead at hardening prices as follows: Spot at 4.20¢; August, at 4.25¢; September, at 4.25¢ @ 4.27½¢; October at 4.20¢ @ 4.30¢; St. Louis being strong and active at 4.05¢, and Chicago firm; 200 tons September lead were taken at the Metal Exchange on first call to-day at 4.30¢. The committee appointed at the Paris meeting of European lead producers for the purpose of elaborating a plan for common action to improve the position of the metal over there if possible, are Mr. Maas, for Stolberg, and for the German group, Mr. Aaron—Rothschild's manager at Paris—on behalf of the French group, and Mr. Sopwith for England and Spain. According to latest advices received it was doubtful whether a common selling office for the three groups will be created, the probability being that in this respect each group will be left to act singly. The export of Pig Lead from Spain during the first four months has been 53,934 tons, as compared with 56,051 last year, and 46,977 in 1886.

Spelter.—The better feeling in Domestic Spelter has, if anything, been strengthened still further, so that with a moderate trade doing, common brands may be quoted 4.62½¢ @ 4.65¢, and Silesiar, which rose in London from £16 to £16. 7/6, 5¢ @ 5½¢ as to brand. Spanish exportation of Calamine during the first four months has been only 11,186 tons, against 14,129 last year, and 16,522 in 1886.

Antimony.—Has been moderately active at 9½¢ Hallett, and 13½¢ @ 13½¢ Cookson. The former gave way in London from £39. 10/ to £39.

New York Metal Exchange.

The following sales are reported:

THURSDAY, August 2.	
50,000 lb Copper, spot.....	16.75¢
50 tons Lead, spot.....	4.12½¢
50 tons Lead, September.....	4.12½¢
10 tons Tin, October.....	19.70¢
10 tons Tin, October.....	19.90¢
10 tons Tin, October.....	19.85¢
25 tons Tin, prompt shipment.....	20.00¢
66 tons Lead, September.....	4.15¢

16 tons Lead, August.....	4.17½¢
48 tons Lead, September.....	4.15¢

FRIDAY, August 3.

50,000 lb Copper, November.....	16.50¢
50 tons Lead, spot.....	4.20¢
50 tons Lead, October.....	4.20¢
32 tons Lead, September.....	4.25¢

MONDAY, August 6.

96 tons Lead, August.....	4.25¢
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TUESDAY, August 7.

50,000 lb Copper, spot.....	16.75¢
50 tons Lead, September.....	4.27½¢
48 tons Lead, October.....	4.30¢

WEDNESDAY, August 8.

200 tons Lead, September.....	4.30¢
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British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]
LONDON, WEDNESDAY, August 8, 1888.

The Block Tin market continues to derive considerable support from the great change in the statistical position due to enormous purchases for consumption that followed the break in the late famous "deal." Deliveries on these purchases continue to exceed the receipts from the sources of supply, and inconvenience operators who persist selling the metal "short." In fact, the purchases against such sales came directly into play as a factor in the upward turn of prices the past week. Consumers, it is said, have their present and near future wants well provided for. This fact has encouraged a belief that the future of the market hinges upon the volume of shipments from the Straits, and, as the latter are rather in excess of expectations, "short" selling has been carried on, with the results above stated.

There is no material change in the Copper market, as far at least as the syndicate is concerned. This interest continues to be a steady buyer of Chili Bars and displays no sign of being affected in any degree by the continued rapid accumulation of stocks or extensive dealings in other kinds of the metal. The visible supply in Europe, according to James Lewis & Sons' circular, is now 75,000 tons, against 71,900 tons last month and 52,000 tons a year ago. So far as can be learned, the syndicate has sold very little Copper to English consumers the past month. There is, however, more anxiety among the latter, as the supplies of old Copper are nearly exhausted, and the offerings from outside sources considerably diminished. The syndicate people have been willing buyers of furnace material, and are said to have left orders to purchase everything offered, in order that stocks may be more concentrated and consumers prevented from securing supplies except from them. Another new form of contract has been adopted, under which no less than 50 brands are a good delivery. The list includes English, American, Australian, German and Japanese makes. The Merton's are said to have taken over the Morfa Works.

The Tin Plate market remains very firm; makers are well sold ahead, and there is still a good demand for some sorts. The total stock at British shipping ports is 236,000 boxes, against 226,000 boxes July 1 and 232,000 boxes June 1. The stock a year ago was 157,000 boxes.

The Scotch "warrant" market has reacted sharply under pressure to sell for early delivery. The volume of business has been very large. More furnaces are blowing.

In the Steel Rail market there has been an active business, and makers, in many instances, are holding back for higher prices. In the other branches of the Steel trade there is little change. It is reported that Whitwells is about to lay down a new steel plant.

Scotch Pig.—Prices for makers' brands are firmly held, but business is moderate.

No. 1 Coltness, f.o.b. Glasgow	48.6
No. 1 Summerlee, " "	48.7
No. 1 Gartsherrie, " "	45.7
No. 1 Langloan, " "	46.7
No. 1 Carnbroe, " "	40.7
No. 1 Rhotts, " at Leith	45.7
No. 1 Gt. Glasgow, " Ardrossan	43.6
No. 1 Dalmeilington, " "	40.6
No. 1 Eglinton, " "	39.6
Steamer freights, Glasgow to New York	
4 @ 5/; Liverpool to New York. 6/3.	

Cleveland Pig.—Trade has been quieter and prices are not quite so firm. No. 1 Middlesboro', G.M.B., 35/6; No. 3 do., 32/9.

Bessemer Pig.—The market very steady, with a continued good demand. West Coast brands, mixed numbers, 43/6, f.o.b. shipping point.

Spiegeleisen.—Demand is quite brisk and prices are very firm. English 20¢ quoted 80/, f.o.b. N. W. England shipping point.

Steel Rails.—There is a good business at firm prices. Standard sections quoted at £3. 17/6, f.o.b. at N. W. England shipping point. Middlesboro' district 2/6 less.

Steel Blooms.—The market quiet and prices barely steady. We quote at £3. 12/6 for 7 x 7, f.o.b. at N. W. England shipping point.

Steel Billets.—Demand keeps up well, and prices are firm. Bessemer, 2½ x 2½ inch, £3. 18/3, f.o.b. at N. W. England shipping point.

Steel Slabs.—The demand moderate and prices somewhat nominal. Bessemer, £3. 17/6, f.o.b. at N. W. England shipping point.

Steel Wire Rods.—The market remains very quiet. Mild Steel No. 6 quoted at £5. 16/ and No. 5 at £5. 14/, f.o.b. at N. W. England shipping point.

Old Rails.—Business very fair and values steady. Tees quoted at £2. 15/, and Double Heads £2. 18/3, c.i.f., New York.

Scrap Iron.—A fair business at steady prices. Heavy Wrought quoted at £2. 7/6 @ £2. 10/, f.o.b.

Crop Ends.—Prices steady and the demand fair. Bessemer quoted £2. 5/ @ £2. 7/6, f.o.b.

Tin Plate.—Demand continues fairly active, and the market remains firm. We quote, f.o.b. Liverpool:

IC Charcoal, Allaway grade	14/6 @ 15/
IC Bessemer steel, Coke finish	13/ @ 13/3
IC Siemens " "	13/3 @ 13/6
IC Coke, B. V. grade	12/9 @ 13/
Charcoal Terne, Dean grade	12/9 @ 13/

Manufactured Iron.—There is a good trade at generally firm prices. We quote, f.o.b. Liverpool:

Staff. Ord. Marked Bars	£ s. d. @ 7 10 0
Common " "	4 17 6 @ 5 0 0
" Bl'k Sheet, singles	6 @ 6 15 0
Welsh Bars (f.o.b. Wales)	4 12 6 @ 4 15 0

Tin.—The market very firm. Straits quoted at £90. 5/ @ £90. 10/, spot, and £90. 10/ @ £91 for three months' futures.

Copper.—Not much doing, but the market firm. Chili Bars closed at £81. 15/ @ £81. 17/6, spot, and £78 @ £78. 5/ three months' futures. Best Selected, £75. 10/ @ £75. 15/.

Lead.—Quiet market, with prices steady. Soft Spanish, £13 @ £13. 2/6 at the close.

Spelter.—Market stronger, with demand active. Silesian, ordinary, £16. /5 @ £16. 10/ at the close.

Financial.

In the review of the week, while the general tone is cheerful and the outlook steadily improving, it can hardly be said that there is an actual gain in the volume of business in the country at large as compared with last year, the indications being to the contrary. In the New York City trade, irrespective of speculative movements, there are signs of revival. Our dry goods commission-houses report the receipt of orders for some descriptions of fall goods, and Southern merchants now arriving to replenish their stocks bring assurances of a good trade in prospect. From interior markets reports are satisfactory. The great controlling factor is the crop situation, which continues to be much more encouraging, especially with reference to the prospective European demand. Bad harvests abroad, and a promise of abundance at home, already operate to affect the course of foreign exchange. Influenced by reports of damage to crops in France and England wheat has been active and excited, with free buying on foreign account, but prices are unsettled. Breadstuffs are stronger. Refined sugar was marked down in order to break the market for raws. Spot cotton is ½¢ better.

The Stock Exchange markets were dull and irregular until Monday, with lower prices in London. On Monday afternoon Lackawanna and Reading started upward, on reports of an improved condition of the coal trade; there was good buying of the grangers on still more favorable news from the West regarding the crops; Lake Shore and the other Vanderbilts advanced, and the tone was generally strong to the close. Chicago, Burlington and Quincy operated as a damper by reporting a decrease of \$186,900 in its gross earnings and \$506,900 in its net for June, while for six months ending with June the company scores a decrease in its net of \$4,700,000. The impression seems to be growing stronger that the temporary injunction recently granted by Judge Brewer against the Iowa commissioners will soon be made perpetual.

United States bonds are quoted as follows:

U. S. 4½, 1891, registered	109½
U. S. 4½, 1891, coupon	107½
U. S. 4s, 1907, registered	127½
U. S. 4s, 1907, coupon	127½
U. S. currency 6s	120

The clearings of 38 cities last week aggregated \$912,837,265, a decrease of 12.3 % as compared with the previous year. Outside of New York the decrease was only 1.6 %. This city reported a falling of 17.5 %, Philadelphia, 9.9 %, St. Louis, 19.7 %, San Francisco, 3.2 %, Baltimore, 2.2 %, Cincinnati, 3.6 %, St. Paul, 11.8 %, Minneapolis, 11.3 %, St. Joseph, 15.6 %, Denver, 7.6 %, Wichita, 13.5 % and Norfolk, 15.6 %. Boston increased 0.7 %. Chicago, 0.5 %, Pittsburgh, 19.1 %, Kansas City, 10.8 %, Milwaukee, 24.6 %, Detroit, 24.3 %, Columbus, 25.9 %, Memphis, 15.2 %, Peoria, 20.7 %, Duluth, 31.2 % and Topeka, 39.5 %.

Respecting crop prospects the St. Paul *Pioneer News* observes: "Not for many years has the business horizon in the Northwest been as free from clouds as it is to-day. Unless all signs fail, this is to prove one of the most prosperous seasons ever known." The Kansas State Board of Agriculture has reports representing nearly every county in the State, which show that the corn crop has suffered injury, but the average of wheat and oats is higher than heretofore reported. The

Missouri State Board reports that wheat is threshing out better than expected, and will equal 72.8 of a full crop; corn, 93; oats, 88. The San Francisco *Daily News* states that the new cereal year opens propitiously. The wheat crop, though not large, is of fine quality, and will probably equal in quantity, if not exceed, that of last year. This, with a good Oregon crop and a heavy surplus stock of 6,750,000 bushels from last year, will supply cargoes for a large fleet, if the foreign market warrants its shipment. The cotton crop, according to special advises, generally promises well.

The weekly bank statement shows no essential change in cash resources. There is a decrease of \$365,800 in the surplus, due to an expansion in loans of \$2,215,000. The excess of reserve is thus reduced to \$26,747,635, as against only \$6,920,000 at the corresponding time in 1887 and \$8,647,000 in 1886, indicating an unusually strong position. Bankers are looking for a more active demand at an early date and are indisposed to make time loans, for, while rates are nominal, commercial paper is in good supply, but only the best names are in demand, as lenders are more wary since the recent failures in dry goods and other lines. We quote 60 days' prime paper 4 ¢ @ 4½ ¢; longer dates 4½ ¢ @ 6½ ¢. Rates in London have advanced, owing to withdrawals of gold from the Bank of England, and an advance in the official rate is looked for. The London *Economist*, while expecting a continued outflow of gold to South America, is also calculating upon exports of the precious metal to the United States during the autumn, the editor remarking: "There can be no doubt that both here and on the Continent the harvest promises to fall below the average, while America now seems likely to have much better crops than were anticipated." In New York the rates for sterling were again reduced on Friday, the effects of a constant movement of American securities to Europe, in addition to grain bills and cotton futures, usual at this time in the year. The imports and exports of specie at this port during the week were nominal. Since January 1 the exports are \$25,500,000, or about \$20,000,000 in excess of the imports. The purchases of United States bonds, under circular of April 17, 1888, have been as follows: Amount of 4s purchased, \$18,740,850; amount of 4½s, \$9,157,300; total, \$27,898,150. Cost—4s, \$23,801,408.46; cost of 4½s, \$9,859,637.20; total, \$33,661,045.66. The net decrease in the debt, less cash in the Treasury, during the month of July, was \$4,137,000.

The importations of merchandise at this port during the week were much reduced, the valuation being \$8,164,000, of which \$2,850,000 represents dry goods. Since January 1 the total is \$284,578,000, against \$281,560,000 for the same time last year and \$259,300,000 in 1886.

Although railroad foreclosure sales have been only 12 in number during the first half of last year, the *Railway Age* concludes that this favorable showing is more than offset by the fact that receiverships have been announced in more cases and upon roads of greater capital and mileage during the six months than during the entire year preceding.

The San Francisco *Bulletin* thinks that as that city's ability to build first-class iron ships, as was shown in the manufacture of the Charleston for the Government, has been demonstrated, the city may hereafter build vessels for the Governments of China, Japan, Argentine Republic, Chili, Brazil, Central American countries, Mexico and Peru, instead of England and other European countries, because that town is nearer home.

Imports.

The imports of Iron and Steel, Hardware, &c., at this port from July 21 to August 4, inclusive, and from January 1 to August 4, inclusive, were as follows:

Iron and Steel.

	July 2 to Aug. 4. Tons.	Jan. 1 to Aug. 4. Tons.
Pig Iron: Naylor & Co.....	1,013	6,257
Crocker Bros.....	600	6,800
James Williamson & Co.....	500	3,100
G. W. Stetson & Co.....	200	11,200
N. S. Bartlett.....	200	3,300
Dana & Co.....	200	501
Spiegelstein: Crocker Bros.....	745	2,602
Naylor & Co.....	220	5,473
Dana & Co.....	200	501
Geisenheimer & Co.....	25	180
Steel: W. F. Wagner.....	67	992
Naylor & Co.....	54	558
R. H. Wolf & Co.....	52	312
Ogden & Wallace.....	39	39
Thos. Prosser & Son.....	37	55
J. Abbott & Co.....	19	343
Lalanc & G. Mfg. Company.....	16	41
C. F. Boker.....	15	147 1/2
Chas. Hugill.....	25	189 1/2
F. S. Pliditch.....	10	281
Newton & Shipman.....	5	112
C. W. Power.....	5	46
N. Cohn & Co.....	4	171
Steel Rods: Naylor & Co.....	606	12,404
Dana & Co.....	600	1,752
R. H. Wolf & Co.....	429	2,912
N. Lillenberg.....	100	100
J. G. Wilson.....	26	26
S. A. Galpin.....	12	2,022
Cary & Moen.....	10	589
Hy. Whittemore & Co.....	5	10,965
Iron Ore: A. Earnshaw.....	897	5,883
R. de Flores.....	710	5,915
Steel Blooms: Naylor & Co.....	447	1,756
Steel Sheets: Pierson & Co.....	44	602
R. Crooks & Co.....	23	290
Naylor & Co.....	8	427
Steel Billets: E. S. Wheeler & Co.....	12	12
Steel Plates: Naylor & Co.....	24	195
Steel Crop Ends: Naylor & Co.....	275	1,295
Steel Bloom Ends: Dana & Co.....	202	202
Steel Wire: Cary & Moen.....	45	45
Montgomery & Co.....	23	23
J. A. Roebeling's Sons.....	22	175
Steel Forgings: Thos. Prosser & Son.....	273	3,087 1/2
Steel Hoops: J. S. Leng's Sons.....	120	250
Hy. Whittemore & Co.....	15	15
Steel Rails: Delaware, L. and W. R. R. Co.....	558	558
Erle Dispatch.....	6	6
Iron: G. Lundberg.....	87	337
J. Abbott & Co.....	28	1,563 1/2
Rivet Rods: J. Abbott & Co.....	201	2,428
Naylor & Co.....	121	271
Muller, Schall & Co.....	18	118
G. Lundberg.....	17	296
Iron Rods: Lazard Bros.....	48	48
Wire Rods: R. H. Wolf & Co.....	23	38
Charcoal Iron: Naylor & Co.....	72	97
Muller, Schall & Co.....	9	27
Swedish Iron: Naylor & Co.....	4	4
Roller Iron: Naylor & Co.....	20	20
Nail Rods: Muller, Schall & Co.....	50	50
Swedish Iron Rivet Rods: C. V. Philp.....	60	60
Iron Girders: R. F. Downing & Co.....	55	418
Scrap Iron: Bowering & Archibald.....	100	100
Screw Rods: American Screw Co.....	110	395
Channel Iron: Bacon & Co.....	102	102
Iron Beams: R. F. Downing & Co.....	80	12
W. H. Wallace & Co.....	50	304
Naylor & Co.....	9	9
Sheet Iron: T. B. Coddington & Co.....	68	882
Cotton Ties: Naylor & Co.....	960	2,350
Bullard & W.....	100	100
Iron Wheels: R. F. Downing & Co.....	20	26
Iron Girders: W. H. Wallace & Co.....	45	254
R. F. Downing & Co.....	4	367

Tin Plates.

	Boxes.	Boxes.
Phelps, Dodge & Co.....	15,121	305,417
D. Van Dusen & Co.....	13,159	102,741
A. A. Thomsen & Co.....	9,457	70,068
T. B. Coddington & Co.....	8,011	101,880
Bruce & Cook.....	7,447	64,085
B. L. Cort & Co.....	7,363	67,013
Pratt Mfg. Co.....	7,362	103,720
R. Crooks & Co.....	4,586	43,090
Lombard, Ayres & Co.....	2,090	8,718
H. R. Demitt & Co.....	2,524	12,622
Central Stamping Co.....	2,451	19,941
J. Byrne & Son.....	2,321	22,802
G. B. Morewood & Co.....	2,250	26,689
Wolf & Roessing.....	1,758	20,432
E. S. Wheeler & Co.....	1,701	3,434
Lalanc & G. Mfg. Co.....	1,013	2,568
S. Shepard & Co.....	1,003	13,320
Merchant & Co.....	867	16,277
J. M. Warren & Co.....	900	750
C. S. Mersick & Co.....	500	4,742
Corbiere, Fellows & Co.....	330	6,358
Sanders Bros.....	330	330
Hy. Whittemore & Co.....	25	39,814

Metals.

	Pounds.	Pounds.
Tin: Muller, Schall & Co.....	1,097,591	7,461,266
Naylor & Co.....	380,401	1,497,696
American Metal Co.....	294,839	867,604
Phelps, Dodge & Co.....	224,142	1,047,156
Thos. J. Pope's Sons & Co.....	134,567	248,785
D. Thomsen & Co.....	21,206	156,569
Hendricks Bros.....	11,228	275,892
Spelter: Hendricks Bros.....	55,962	111,962
Naylor & Co.....	55,372	308,675
Copper: Lewisohn Bros.....	105,824	217,636
Zinc: G. A. & E. Meyer.....	1,113	1,113
Old Brass: Jas. E. Ward & Co.....	18,023	18,023
Antimony: Phelps, Dodge & Co.....	30	410

Hardware, Machinery, &c.

Ansonia Clock Company, cs., 31
Barbour Bros. & Co., Mch'y, cs., 19
Bernard, Geo., Ironwork, cs., 5
Boker, Hermann & Co., Mdse., cs., 54; Arms, cs., 42
Clark Mile End Company, Mach'y, pkgs., 34
Field, Alfred & Co., Scales, cs., 65
Foley, E., Mch'y, cs., 11
Folsom, H. & D., Arms, cs., 3
Graef Cutlery Company, Cutlery, cs., 4
Hammacher, Schlemmer & Co., Tools, ck., 1
Judd, H. L. & Co., Mdse., cs., 4
Kastor, Ad., Cutlery, cs., 10; Mdse., cs., 3
Purim & Co., Files, cks., 5
Schoverling, A., Arms, cs., 27
Shoverling, Daly & Gales, Arms, cs., 43
Summer, Chas. P. & Co., Mch'y, pkgs., 23; ditto, cs., 3
Straud & Co., Rivets, cs., 11
Taylor, W. S., Mach'y, pkgs., 15
Tyler Wire Works Company, case, 1
Western Transit Company, Chains, cks., 11
Wiebusch & Hilger, Lim., Mdse., cs., 13; Anvils, 91
Witte, John G. & Bro., Arms, cs., 4; Cutlery, cs., 10
Order: Mach'y, cs. 11; do., boxes, 5; Machy, pkgs., 15

Irons and Metals Warehoused from July 21 to August 4, inclusive:

	Tons.
Spiegelstein: J. A. Jansen.....	500

Exports of Metals.

	July 21. to August 4. Pounds.	Jan. 1. to August 4. Pounds.
Copper: J. Abbott & Co.....	1,405,956	8,108,045
Lewisohn Bros.....		3,579,022
F. A. Lomal.....		2,581,293
American Metal Company.....	112,168	4,805,140
G. H. Nichols.....		223,939
J. Bruce Ismay.....		112,000
S. Mendel.....		500,000
Ledoux & Co.....		110,276
Muller, Schall & Co.....		430,000
Copper Queen Con. M. Com-pany.....		224,084
J. Kennedy, Tod & Co.....		112,023
H. Becker & Co.....		1,250
Orford C. & S. Rfg. Company.....		224,881
Robt. M. Thompson.....		125,000
Thos. J. Pope, Sons & Co.....		765,880
J. Parsons & Co.....		206,250
Bridgeport Copper Com-pany.....		112,000
C. Herold.....		250,000
Phelps Bros.....		6,250
R. W. Jones.....		189,984
Copper Matte: Williams & Terhune.....	1,197,787	33,568,077
Lewisohn Bros.....		3,021,610
American Metal Company.....	347,742	1,844,941
J. Abbott & Co.....		295,000
C. Ledoux & Co.....		485,800
F. W. J. Hurst.....		184,288
G. H. Nichols.....		722,777
H. T. Nichols & Co.....		180,995
Old Copper: Burgess & Co.....	23,400	513,174

Detroit.

WILLIAM F. JARVIS & Co., under date of August 6, report as follows: It is with pleasure we have again to report a strong market, and one which seems to be gaining strength daily. It is now affecting material of all kinds. A straight advance of from 50¢ to \$1 1/2 per ton can be noted upon Southern Irons, the larger advance being on Mill grades. Lake freights have advanced materially, causing a corresponding advance among the makers of Pig in the Mahoning and Shenango valleys. Also to lower Lake Superior charcoal furnaces, who, in addition to the advance to be obtained for increased cost, are in the healthy condition of being largely sold ahead, and continued demands upon their stocks are to be noted. Old Wheels are becoming a scarce article again, and prices look toward an advance in that direction. While the buying which is being done at this time is more or less to be considered as periodical and of a magnitude that will not continue, the calls this year are so largely in

excess of what they have been during similar periods of other years that it cannot fail to affect the price. We quote the market firm as below:

Lake Superior Charcoal, all num-bers.....	\$20.00 @ \$20.50
Lake Superior Coke, all ore.....	19.25 @ 19.75
Lake Superior Coke, cinder mixed.....	19.00 @ 18.50
Standard Ohio Black Band.....	19.25 @ 19.75
Southern No. 2.....	17.75 @ 18.25
Southern Gray Forge.....	15.75 @ 16.25
Southern Silvery.....	17.00 @ 17.50
Jackson County (Ohio) Silvery.....	18.50 @ 19.00
Old Wheels.....	19.00 @ 19.75

Burnishing Iron and Steel by Electricity.—The following method for burnishing iron and steel by means of the electric current was communicated by A. de Meritens at a meeting of the International Electric Society in Paris. The layer of oxide on the surface of the metal is obtained by placing the same as anode in a bath of common or distilled water. The sides of the vessel holding the liquid, or a piece of iron, copper or carbon, are used as cathode. The temperature of the water is kept at 160° to 175° F. The electromotive force must be just strong enough to decompose the water, as a current which is too strong gives a dusty layer which is not permanent. Under the action of the oxygen liberating at the anode, a layer of a black oxide (Fe₃O₄) forms on the metal. This layer can be easily polished, steel giving the best results, while on cast and rod iron a more dusty layer is obtained, though the use of distilled water makes the polish permanent.

A Dusseldorf letter speaks of the principal manufacturers of cutlery in Germany. The largest tool factories in the world are found in Remscheid. Solingen, the German Sheffield, Damascus and Toledo combined, is another town situated in the district of Dusseldorf. The entire population of this town, and of the vicinity, is occupied in the manufacture of cutlery. Every conceivable article used as an instrument to cut is made here. The German Government employs thousands of men here every day to manufacture her weapons; the sugar planter of the South gets his large knives from here, which serve him for cutting sugar cane; the Esquimaux knife is made here for slicing the sea lion and the whale; the erasing knife of the patient editor, the dissecting instrument of the surgeon and the harmless tool which the domestic uses for peeling the potatoes, as well as the article which is often vainly tried for cutting a broiled steak in a cheap restaurant—all these are made in Solingen. In Radevormwald, containing 10,000 inhabitants, everybody is engaged in the manufacture of locks, keys, files, hammers, tongs, &c.

In a paper on the composition of water by volume, by Mr. A. Scott—"Proceedings" of the British Royal Society—the ratio by volume in which oxygen and hydrogen combine at 0° and 760 mm. is redetermined. The apparatus used is so arranged that both gases are measured in the same vessel, a separate vessel being used for exploding. After explosion the residue was analyzed by exploding with oxygen or hydrogen and the impurity—nitrogen and carbonic anhydride—determined. The oxygen was obtained from potassic chlorate and from mercuric oxide prepared from the nitrate; the hydrogen was obtained by electrolysis. The ratio obtained is 1.994 : 1, which, with 15.9627 for the density of oxygen, gives 16.01 as the atomic weight of oxygen.

The American ambulance system has been formally adopted in Paris, with the sanction of the French Government.

Hardware.

The volume of business has been moderate during the week, without any very noticeable feature. Travelers are sending in a fair number of orders, but they are generally small in amount, buyers seeming to feel far from sure of the solidity of prices. Manufacturers, on their part, exhibit more firmness than has been the case for some time, and are improving in the art of saying "no" when orders are offered at cut prices.

Cut Nails.

After the dullness of the past month, there is a somewhat better movement in Cut Nails, and it is observed that the proportion of Steel Nails called for is growing. Inquiries are running toward heavier lots, but prices remain unsatisfactory, concessions from \$1.90 on dock for carload lots being made with some frequency.

E. G. Scovill, of St. John, New Brunswick, has issued a circular, from which we quote as under: "Your attention is called to the large amount of money which can be made by manufacturing Cut Nails and Bar Iron under the present Canadian tariff. As a paying investment there is nothing to equal it in the history of the American Iron trade. Cut Nails are worth, wholesale, in Canadian market, \$2.60 per keg of 100 pounds for 10d., and upwards, other sizes in proportion; or 55 cents a keg more than in the Boston market, while Scrap Iron can be landed here at \$4.82 per ton less than in the United States, this amount being the difference saved between United States duty on Scrap Iron of \$6.82 per ton and Canadian duty of \$2 per ton, viz.:

	Per ton.
55 cents a keg more than in Boston market, wholesale.....	\$11.00
Saved on Scrap Iron.....	4.82
Total.....	\$15.82

amount to credit of manufacturing here over and above Boston wholesale prices, which leaves the manufacturer a good profit. The demand for Bar Iron is large and increasing and the profit of manufacturing is much larger than in the United States. Suitable coals from Nova Scotia can be laid down at proposed works at \$2.65 per ton. Within six months we will have the Short Line Railway open, placing us within 16 hours of Montreal, which will also open that market to this company, as finished goods can be taken to Montreal and other western points at a much less proportionate rate of freight than the manufacturers there pay upon our coal, which they must have. I intend forming a company with a capital of \$200,000, in 2000 shares of \$100 each, organized under the laws of New Brunswick. This company will pay a yearly dividend of 20 per cent. on its paid-up capital, at present prices."

Barb Wire.

The apathy of the past month shows a few signs of being dispelled, but what movement there is still confined almost exclusively to small lots, carload orders being scarce, so that the quotation of 4 cents in this market is entirely nominal. Reports from the West indicate very sharp competition for business there, with low prices prevailing. It is believed that the financial necessities of some of the mills force them to market their product. To some extent the demoralization is due, however, to the low prices made on Plain Wire for Barbing. Reports from the South point to a better demand from that quarter. The export trade is dull.

Cordage continues feverish and advancing on account of the Manila Hemp market, which is exceedingly strong both here and in London, and Sisal is kept up by sympathy. The demand is large, stock small, and manufacturers are behind in their orders. We quote as manufacturers' prices, subject to 1½ per cent. discount for cash in ten days:

Manila, ½ inch and larger.....	11½ cents per lb
Manila, ¾ inch.....	12 " "
Manila, 1 and 5-16 inch.....	12½ " "
Manila Tarred Rope.....	11 " "
Manila Hay Rope.....	11½ " "
Sisal, ½ inch and larger.....	9½ " "
Sisal, ¾ inch.....	9¾ " "
Sisal, 1 and 5-16 inch.....	10½ " "
Sisal Hay Rope.....	9½ " "
Sisal Tarred Rope.....	8¾ " "
Sisal Medium Lath Yarn.....	8½ " "

Henry Schade, who is well known as a manufacturer of Silver-Plated Ware, 56 and 58 Ainslie street, Brooklyn, E. D., N. Y., is manufacturing the Brooklyn Latch, of which he is sending out a colored lithograph for distribution among his customers. The discount on the Latch is 40 and 10 per cent.

L. & I. J. White, Buffalo, N. Y., have just issued a new catalogue and price list of their Coopers', Carpenters', Ship, Butchers' and Ice Tools, Machine Knives and other specialties, in a neat and tasteful pamphlet of about 12 more pages than their previous issue. This additional space is taken up by the new articles which they have added to their line, which is yearly becoming more complete. They say that during the year they have greatly enlarged their works, and are now prepared to fill orders with dispatch.

The fall circular of McIntosh, Huntington & Co., Cleveland, Ohio, is before us, giving price lists and illustrations of a line of seasonable goods.

An incorporated company has been formed under the name of W. K. Morison & Co., to carry on the retail Hardware business at Minneapolis, Minn. The capital is to be \$100,000, payable as may be ordered by the directors. The indebtedness of the corporation is limited to \$40,000. W. K. Morison is president and J. Louis Pendleton secretary and treasurer.

The Adams & Westlake Company, Chicago, put upon the market a short time since an iron half-bushel Measure, which has met with much favor. The body is made of heavy sheet iron, but the bottom is of wood, and a wooden hoop is fastened round the top to stiffen it and enable it to be grasped anywhere without shifting position. The sides flare sufficiently to nest, so that the Measures can be packed in racks of one dozen without taking up much space either in shipping or storage. They are japanned in assorted colors.

G. Getty Stuart, late with Clement M. Biddle & Co., of Philadelphia, and F. W. McLean, recently connected with the Biddle Purchasing Agency as its representative in Pittsburgh, have formed a co-partnership under the style of Stuart & McLean as brokers and commission merchants in Iron, Steel, General Hardware and Railway Supplies. The headquarters of the new firm are in the Hamilton Building, Pittsburgh, Pa., where they will be glad to see their friends and the trade generally.

Hibbard, Spencer, Bartlett & Co., of Chicago, have added a new department to their already extensive operations. They have laid in a full line of Rochester Lamps and are now ready to supply the trade in any quantity. Their stock embraces all grades of Fount and Stand Lamps, Hanging Lamps, Parlor Lamps, Piano Lamps, and all the various trimmings and paraphernalia. The demand for Lamps is steadily increas-

ing in cities as well as in the rural districts, and this enterprising firm intend to have a share of the expanding trade in them. Their stock will embrace the most artistic styles as well as the ordinary grades, so that a buyer can select a complete line. A catalogue is now in preparation and will shortly be issued, showing the various kinds and styles. Hibbard, Spencer, Bartlett & Co. also state that the demand for Political Campaign Goods has set in unusually early. They have already sold as many of these goods as they did in the entire campaign four years since. They are increasing their stock in this line and expect soon to have the largest assortment in the country, comprising everything required for an outfit, from a piece of wick up to a suit of clothes. They have in preparation a catalogue of Campaign Goods which will soon be ready for distribution.

The Enterprise Mfg. Company are now prepared to make Mills to grind Coffee, Pepper and other spices very fine, a thing for which there has long been a certain amount of inquiry.

The Phoenix Caster Company, Indianapolis, Ind., have begun suit against James H. Cutter and Rufus L. Woodrough, for infringement on patent on their Casters.

The Hartman Mfg. Company, of Beaver Falls, Pa., manufacturers of patent steel picket fence and diamond fencing, will soon commence operations in the new works, which are just about completed, at the above place. The company are already in receipt of a large number of orders for their goods, sufficient to keep them busy for some months.

J. E. Emerson, the well-known saw manufacturer, and Thomas Midgley, Beaver Falls, Pa., have purchased 20 acres of land adjoining the Fort Wayne Railroad, and are about commencing the erection of buildings for the manufacture of their patent wire belting and hose. They have had the belting in use a sufficient length of time to test its practicability, but it will be some months before they will be in a position to put any on the market. This belting is covered by a number of patents. The buildings will consist of one brick building, 60 x 40, one story, and a one-story frame building, 50 x 30. The brick building will be used for the furnaces and the frame building for weaving machines.

The Reading Hardware Company are now running the Manhattan plant and all departments of their old works which were not destroyed by fire, and are now prepared to accept orders for, and to furnish promptly, a very large proportion of their line, including their popular Geneva Hardware.

The Columbiana Pump and Machine Company, Columbiana, Ohio, write, under date of July 24, as follows: "We have lately added some new machinery and increased our facilities and are turning out work equal to any made. Have just completed arrangements with the Kansas City Pump Company, of Kansas City, Mo., to represent us in that city, and will ship them a large quantity of our goods within ten days."

Isaac P. Madden, of the Madden & Cockayne File Works, of Middletown, N. Y., and secretary and treasurer of the Middletown and Crawford Railroad Company, died on Tuesday of apoplexy. He was 52 years of age. Mr. Madden has been a prominent member of the Board of Education of Middletown for many years, and was universally respected as a man of unblemished personal and business character.

Standard Price List of Emery Wheels.

August 1, 1888.

Diameter in inches.	THICKNESS IN INCHES.																Diameter in inches.
	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{1}{4}$	2 $\frac{1}{2}$	3	3 $\frac{1}{4}$	3 $\frac{1}{2}$	4	4 $\frac{1}{4}$	4 $\frac{1}{2}$	
1 $\frac{1}{2}$	\$0.40	\$0.45	\$0.50	\$0.55	\$0.60	\$0.65	\$0.70	\$0.75	\$0.80	\$0.85	\$0.90	\$0.95	\$1.00	\$1.05	\$1.10		1 $\frac{1}{2}$
2	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1.00	1.05	1.10	1.15	1.20		2
2 $\frac{1}{2}$	.65	.75	.85	.95	1.05	1.15	1.25	1.35	1.45	1.55	1.65	1.75	1.85	1.95	2.05		2 $\frac{1}{2}$
3	.80	.95	1.10	1.25	1.40	1.55	1.70	1.85	2.00	2.15	2.30	2.45	2.60	2.75	2.90		3
3 $\frac{1}{2}$	.95	1.15	1.35	1.55	1.75	1.95	2.15	2.35	2.55	2.75	2.95	3.15	3.35	3.55	3.75		3 $\frac{1}{2}$
4	1.10	1.35	1.60	1.85	2.10	2.35	2.60	2.85	3.10	3.35	3.60	3.85	4.10	4.35	4.60		4
4 $\frac{1}{2}$	1.25	1.55	1.85	2.15	2.45	2.75	3.05	3.35	3.65	3.95	4.25	4.55	4.85	5.15	5.45		4 $\frac{1}{2}$
5	1.40	1.80	2.20	2.60	3.00	3.40	3.80	4.20	4.60	5.00	5.40	5.80	6.20	6.60	7.00		5
6	1.75	2.40	3.05	3.70	4.35	5.00	5.65	6.30	6.95	7.60	8.25	8.90	9.55	10.20	10.85		6
7	2.15	3.00	3.85	4.70	5.55	6.40	7.25	8.10	8.95	9.80	10.65	11.50	12.35	13.20	14.05		7
8	2.60	3.60	4.60	5.60	6.60	7.60	8.60	9.60	10.60	11.60	12.60	13.60	14.60	15.60	16.60		8
9	3.10	4.25	5.40	6.55	7.70	8.85	10.00	11.15	12.30	13.45	14.60	15.75	16.90	18.05	19.20		9
10	3.65	5.00	6.35	7.70	9.05	10.40	11.75	13.10	14.45	15.80	17.15	18.50	19.85	21.20	22.55		10
12	4.60	6.35	8.10	9.85	11.60	13.35	15.10	16.85	18.60	20.35	22.10	23.85	25.60	27.35	29.10		12
14	6.25	8.45	10.65	12.85	15.05	17.25	19.45	21.65	23.85	26.05	28.25	30.45	32.65	34.85	37.05		14
16	8.00	10.85	13.70	16.55	19.40	22.25	25.10	27.95	30.80	33.65	36.50	39.35	42.20	45.05	47.90		16
18	9.50	13.25	17.00	20.75	24.50	28.25	32.00	35.75	39.50	43.25	47.00	50.75	54.50	58.25	62.00		18
20	11.25	15.75	20.25	24.75	29.25	33.75	38.25	42.75	47.25	51.75	56.25	60.75	65.25	69.75	74.25		20
22	13.00	19.00	25.00	31.00	37.00	43.00	49.00	55.00	61.00	67.00	73.00	79.00	85.00	91.00	97.00		22
24	15.00	22.00	29.00	36.00	43.00	50.00	57.00	64.00	71.00	78.00	85.00	92.00	99.00	106.00	113.00		24
26	.....	.....	35.00	43.00	51.00	59.00	67.00	75.00	83.00	91.00	99.00	107.00	115.00	123.00	131.00		26
30	.....	.....	.....	50.00	61.00	72.00	83.00	94.00	105.00	116.00	127.00	138.00	149.00	160.00	171.00		30
36	.....	.....	.....	.....	95.00	110.50	126.00	141.50	157.00	172.50	188.00	203.50	219.00	234.50	250.00		36
42	.....	.....	.....	.....	.....	160.00	178.00	196.00	214.00	232.00	250.00	268.00	286.00	304.00	.....		42
48	.....	.....	.....	.....	.....	.....	185.00	207.00	229.00	251.00	273.00	295.00	317.00	339.00	361.00		48

We give above the standard price list for Emery Wheels which has been adopted by the Emery Wheel Manufacturers' Association, to go into effect August 1. A careful examination of this list will show that the association have been revising the old price lists, correcting discrepancies, &c. The uniform list thus adopted, as well as the uniform lists for Cup Wheels and Cylinders and Emery Bricks, will be appreciated by the trade, and will doubtless serve their convenience.

The following schedule of prices for special Emery Wheels has also been adopted by the association:

Cone Wheels are to be listed at their full thickness, and their average diameter.

Dish Wheels are to be listed at their full diameter, and greatest thickness.

Pot Balls to be listed at their greatest diameter, and two-thirds of their thickness.

Cylinder Wheels are to be listed at 1 cent per cubic inch more than regular wheels, and the printed price list is figured on this basis.

Cup or Tub Wheels are to be listed the same as Cylinder Wheels, with the price of the inside diameter of Cylinder and thickness of required bottom added at the price of regular Wheels, and intermediate sizes of Cylinders and Cup Wheels in diameter and thickness of rim be listed at next larger size.

Wheels with holes less than 6 inches, same list as for solid wheels, and 6 inches and over deduct for a wheel the same size of the hole, but at one-half the list price only.

Wheels 1 inch in diameter and $\frac{1}{4}$ inch thick shall be listed at 30 cents each, and 5 cents for each $\frac{1}{4}$ inch thickness, and in lots of 100 or more may be sold at a net price of \$10 per hundred.

All intermediate sizes on regular wheel list shall be listed in direct proportion to their diameter by inches.

The matter of discount is not determined by the association, but is left to the different manufacturers.

Plows.

The Northwestern Plow Manufacturers Association will cease to exist after the 14th inst., and the members will thenceforth act independently. It is asserted that unless the demand improves most unexpectedly the price of Plows will decline to a point that will force many manufacturers to suspend production, their united capacity being greatly in excess of the

nominal consumption. It was hoped by those who were prominent in organizing the association that relief from excessive competition could be secured through it, but they were not able to induce all the manufacturers to unite with them. Those who remained outside reaped the benefits of the association without bearing any of its burdens, and in time this became too apparent to be endured any longer. All will now be placed on an even footing, and it is expected that weak establishments will find themselves forced to succumb to the inevitable. The old question of "the survival of the fittest" will evidently be worked out in this branch of trade as it has in some others.

Razor Straps.

The Alford & Berkele Company, 77 Chambers street, New York, have heretofore been agents for the goods made by B. F. Badger, Jr., but, as he has given up business and gone back to his father, "the original, genuine and only" Badger, manufacturer of Badger's & Emerson's Genuine Razor Straps, they have taken the agency for the latter goods. The following new list is now issued, with the uniform discount of 25 per cent., 60 days, or 2 per cent. for cash in 10 days, f.o.b New York or factory.

Benj. F. Badger's Razor Straps.

	Inch.	Per gro.
Imperial Belt.....	12	\$22.50
The Traveler Belt.....	13	27.00
No. 85, German Belt.....	13	36.00
No. 3W Extensible Belt.....	13	40.50
No. A1, Double Rod Belt.....	13	45.00
No. 34, German Belt.....	13	54.00
Standard Belt.....	13	60.00

Patent Combination Strap, Patented February 24, 1885.

	Inch.	Per gro.
The Hub Combination.....	13	\$22.50
Imperial Combination.....	13	27.00
The Traveler Combination.....	13	36.00
No. 85 Combination.....	13	40.50
No. 3W Combination.....	13	45.00
No. A1, German Combination.....	13	54.00
No. 35, Autograph Combination.....	13	63.00
Standard Combination.....	13	90.00
Star A. Genuine Emerson's.....	26.00	
Star B. Genuine Emerson's.....	84.00	
Star C. Genuine Emerson's.....	78.00	
B. Badger's Emerson.....	63.00	
C. Badger's Emerson.....	58.50	
Q. Super quality.....	58.50	
R. Super quality.....	54.00	
No. 75. Full Convex.....	63.00	
No. 76.....	63.00	
No. 80. Leather and Gold Case.....	108.00	

Mr. Badger claims to be the introducer of the "Tension" Strap to the American market, under the name of German Belt.

Stove Polish.

Yates & Co., Rockford, Ill., issue under date of August 1 a reduced price list on Stove Polish. They inform us that their trade the past season has been very satisfactory. They have established several new agencies, and now their goods are obtainable in all the principal cities. Following is the list just adopted:

Superior Liquid Stove Polish.

2-gallon cans, per gallon.....	\$0.80
3-gallon cans, per gallon.....	.70
5-gallon cans, per gallon.....	.60
10-gallon cans, per gallon.....	.50
$\frac{1}{4}$ -pint bottles, per dozen.....	1.20
$\frac{1}{2}$ -pint bottles, $\frac{1}{4}$ gross lots, per dozen.....	1.10
$\frac{1}{2}$ -pint bottles, 1 gross lots, per dozen.....	1.00

Nonpartel Stove Varnish.

5-gallon cans, per gallon.....	\$0.40
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Rust Proof.

2-gallon cans, per gallon.....	\$0.80
3-gallon cans, per gallon.....	.70
5-gallon cans, per gallon.....	.60
10-gallon cans, per gallon.....	.50

Standard Paste Stove Polish.

10-pound, per pound.....	\$0.12 $\frac{1}{2}$
50-pound, per pound.....	.10

Brightline (Nickel Polish).

3-ounce bottles, per dozen.....	\$1.20
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Prepared Stove Putty.

10-pound cans, per pound.....	\$0.10
50-pound cans, per pound.....	.08

Indestructible Fire-Proof Stove Lining.

50-pound bags, per bag.....	\$0.75
100-pound boxes, per box.....	1.50
400-pound barrels, per pound.....	.01 $\frac{1}{4}$

Pure Ceylon Lead, Very Finely Ground.

5, 10 and 25-pound boxes, per pound.....	\$0.10
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Trade Topics.

From A. M. Smith, Pike, N. Y., we have the following practical suggestions with reference to the successful conduct of business. His remarks are prefaced by a reference to the fact that most of the articles which we have published relate to large stores, and that for that reason, perhaps, suggestions in regard to business conducted on a smaller scale may be in order. But it will be seen that in the following communication points are made which are applicable to large as well as small establishments:

No man can succeed in business without neatness and order, without counting, weighing, measuring and marking with the cost and selling price the goods when they come into his store. Nothing is more

damaging to a salesman than to be saying after he has named a price, if the purchaser thinks it too high, he will look up the bill and see what it cost. Such a man will not know what he has in his store, nor how much he is overcharged on his bills, nor whether he gets all the goods his bills call for. He may be pleasant and sociable and happy in the very midst of eternal chaos, but fate will be his enemy, and he will finally sleep in a poor man's grave. Such a man or such a clerk will continue to squander time until finally he is sold out by his creditors, and if he falls back upon a farm he will be just as unthrifty. His buildings will go to ruin and his crops will not be gathered in season. A merchant must be alive six days in the week, letting nothing escape his notice. Eternal vigilance is not more the price of liberty than an ability to attend to small details in succession is the price of commercial success. I know good men who may be in their office late at night or dancing on the floor as salesmen after other dealers have closed up, who always find the place in perfect order. Every morning and during the interim their eyes have been carefully over all from cellar to garret, noticing every pipe, flue, chimney, tank and barrel most critically, to see that nothing is in danger of running to waste.

In the next place I would never under any possible circumstances have a fiddle or a checker-board in the store. They are supreme nuisances. A salesman can wait upon a customer, and then if not employed at once go and attend to some other matter—make out a man's account, mark some goods, replace some goods taken down, pick up something dropped on the floor, go to work arranging things in showcase or show-window, or filling some boxes with Bolts which he has found empty, and thus command the confidence of his employer. His services will always be in demand, because he is so useful that his services are invaluable. On the other hand, if a clerk is born blind in the way of business and can see nothing not called several times to his notice, who is forever fussing about with some boy on a 2-cent trade, who has confidence in everybody and is ever ready to lend new goods or his employer's money without orders, who can spend half a day waiting upon half a dozen customers and get no time to sweep the store or fill a lamp, who is in a mental daze or semi-conscious state, or watching some point in vacancy instead of being as busy as a bee, knowing what to do and systematically attending to his duties—that young man is a fraud and a failure, and will not be likely to ever own a shop or store.

A Boston hardware dealer writes on show windows as follows: "There is hardly any end to the changes that can be made in the show-windows of a hardware store. By taking some chain it is easy to write words, letting the chain pass through the hand, and a nice border can be made in the same way. By using brass and iron chain many fine effects can be produced. Papers of carpet tacks can be arranged to spell the words

CARPET TACKS.

Large spikes can be arranged to say "NAILS." As a foundation for this kind of a display, silk velvet looks well, but it is rather expensive. Paper is cheaper, and can be had in most any color. It would not be a bad plan to set a nice parlor stove in the window, and have the decoration on the bottom of the window done with old-fashioned rag-carpet, and then have lace curtains made from common ticking, which the boys in the shop could use for aprons after the novelty wore off. The merchant who is too lazy to think up something new for his show-

window may become quite aged before he lives in a house that has a mansard roof. A word to the wise, &c."

Arrangement of Stores.

From F. E. Mole & Co., Adams, Mass., we have, in reply to an inquiry from the trade, which appeared in these columns, information in regard to their method of accommodating Belting, their rack for this purpose being shown in the accompanying illustration, Fig. 257. In this rack each space is made to hold 250-foot rolls, with the exception of the larger sizes, say from 5 inches up. The depth of the rack is 2 feet, and it is so constructed that the bottoms of the different partitions slope back about an inch to the foot. It is referred to as inexpensive and as economizing labor in handling Belting. Our correspondents suggest that it could further be improved by running iron rods

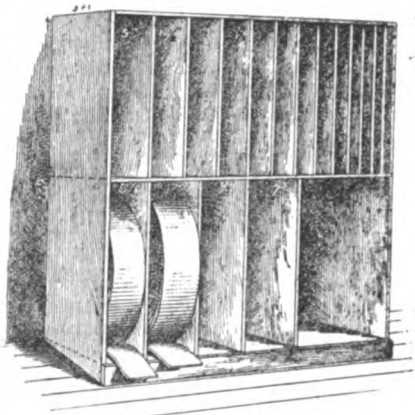


Fig. 257.—Belting Rack.

across the front about 6 inches above the floors on which the Belting rests. This is suggested for the purpose of preventing the Belting from rolling out when measuring. The rack is 4 feet 8 inches wide and 5 feet 1 inch high.

The following suggestions in regard to the arrangement of Hardware stores are given by English merchants and taken from the London *Ironmonger*, a paper which from time to time has given more or less attention to this subject:

As most articles in our trade, being Iron, are of a dark and somber hue, it is most necessary that we should allow as much light into our shops as possible, and it will make a marked difference in their appearance by, to use an expression, "forcing light" into the darker corners, or any part where the light is not good by placing there articles that are of a bright or light color. A showcase should never stand on the floor, in my opinion, as it can be seen better when raised, and also affords a convenient space underneath for showing stock that does not require to be in a case but yet wants a prominent position. If a case is in a bad light, cover the back and top inside with white paper. In like manner face the Brassfoundry. Also, in arranging goods about the shop, place the brightest-colored articles in the poor light and darker ones in the best light. For instance, in showing two sets of Toilet-ware, one may be black and gold and the other light green. Place the former in the best light to show it up, and the latter where the light may not be so good, and it will show up in contrast to the darkness behind it. The same principle will prove good in window-dressing; if the window is dark at the back paper it with white paper, place the lightest-colored articles at the back, and the dark ones will show of themselves in the front. I should also recommend white paper, in the absence of glass shelves, for setting off Electroplate. I might mention that in arranging goods on stands or anywhere for show, always place them with system and regularity, and the same class of goods as much together as possible. In dressing cases the great secret is to make a center, or, if large enough, two centers, of some special articles, and arrange from them to the sides.

The front of the counter should never open except from the back, as it always annoys customers to have to disturb them to get a Tea-Tray out, or, if there are cupboards, to get

whatever stock may be kept there. A few articles hanging loose and a few Bordered Mats make a good show, or a glass case in which goods are shown that need not be got out at the time. A satisfactory arrangement is often made by having a glass partition inclosing the window and dividing off the shop, making a miniature showroom with its front to the street.

On the counter should be a few novelties, or handy, easily-taken-up articles, frequently changed, or a flat glass case for Cutlery, kept tidy; on no account should any desk be fixed to the counter, particularly at the window end; a free passage should be left between the counter and the window inclosure for the assistant to pass through and open the door for the customer's exit. The order and cash books can be kept on a shelf under the counter, and used on the counter for taking customers' instructions. The master's desk should be at the far end or in the middle of the shop. It is objectionable if the master is close within earshot of a customer, as it does not always suit him to attend, yet he appears neglectful if he does not speak; at a distance a bow is often sufficient recognition, and he can then go on with his work, or converse more privately with a traveler. Travelers do not mind how far they have to go into the shop if there is a chance of an order, but customers, particularly strangers, are very chary of going far in; to some extent they think they are trespassers on private premises, and the more so if merely asking the price, or for something they are not very sure about having come to the right shop for.

Glass cases are not so absolutely necessary in an ironmonger's shop. I favor articles in paper to a greater extent than is perhaps usual; glass cases are often only an excuse for laziness. Tin goods are best papered up, as they soon lose their brightness if exposed to the light. Cleanliness is most important, and, owing to the long time goods stand on the shelves without being required, it is often hard to keep up to the mark in that respect.

Circulars on the counter are a mistake, particularly when in untidy heaps. Some makers who print ironmongers' names on circulars at a low rate or free of charge are generally favored by having the whole bundle placed on the counter, where they remain until dirty or useless. They should be placed in neat holders, a few at a time, and renewed fresh and clean; the bulk should be distributed as soon as they arrive, by post or messenger, as then they do more good to both maker and ironmonger.

As regards window dressing I find it necessary and very advantageous to have frequent changes, and also to mark some of the regular going things, especially Cutlery, in plain figures; not to mark all, but a parcel or article here and there, so as to give an idea of the prices. There is one evil in changing the exhibition of stock in windows which ought not to be overlooked, and that is, the tendency of assistants to be so anxious to put in the new or fresh exhibit as to pay little attention to what becomes of what is removed from the window.

I have recently altered a small room on the ground floor, which was formerly little else but a gloomy dungeon, and stocked with Register and Sham Register Grates, mixed up anyhow, into a very nice little show-room; papered the walls nicely, and covered the floor with linoleum, and introduced light, and fitted it up with shelves draped from top to bottom with red glazed cloth, and on the shelves I have samples, either one, two, or three, as room will permit, of everything in stock likely to be wanted by a housekeeper, and it is surprising the wonderful convenience and profit in it in various ways. Without saying more on this point I will give an instance of results. A lady called and wanted a Stewpan. I knew there were samples in this room, so took her in. The right size was not there, so I asked her to take a seat while I fetched it. By the time I returned she had selected seven other articles from the shelves, which, as she said, she would never have thought of had she not seen them, and expressed herself pleased with the arrangement; in fact, had no idea I kept such things in stock. And in regard to this room, when any article is sold it is at once replaced, and thus we find out when stock is running low. Before entering this small sample show-room customers have to pass through a larger show-room, in which are exhibited large goods, such as Hip and Sponge Baths, Trays, Cutlery in glass cases, Lamps, Mowing Machines, &c.

Another good arrangement is the Nail room, where everything we profess to keep in the shape of a Nail, from the smallest Gimp-Pin to a 7-inch Spike, is, or ought to be, found, the bulk of the stock being kept in a cellar.

Louisville Trade Items.

We have the following from Louisville under date of the 4th inst.

The Hardware trade of this week is about on an average of last, except in some lines of heavy goods, where it eclipses all previous

weeks. The shipments of one house alone have run up to as much as 17 heavy two-horse wagon loads per day, and in this city two horses haul as much as three or four in other places on account of our excellent streets of granite block. One other house averages a daily tonnage of 100 tons each way, in and out. Most of the jobbers report trade very heavy, quite equal to the corresponding time of last year, which was the heaviest in the business for many years. Large stocks are constantly coming in, the purchase of which seems to be warranted by the excellent prospects of the growing crops of corn and tobacco of this region and the cotton in the lower States, where the best territory lies, supplemented by the large inflow of wheat now being marketed.

A great deal of Barb Wire is going out, together with all the other Hardware belonging to the country, and also builders' wares for finishing, such as Doors, Blinds, Sashes, Sash Weights, Hinges, Locks, &c., are moving briskly. There is beginning to be a scarcity of Bar Iron, caused by the suspension of the mills in July, and frequent inquiries for common Sheet are made, especially since the assignment of the Aurora Iron Works, of Aurora, Ind. They had large contracts in this city and adjacent territory, and now some of their customers are in a predicament, and are anxiously, but very quietly, feeling the market. And yet they are in doubt whether to contract for large lots, because the Aurora Mill may come round and partly fill orders, for which they were booked full, up to December, at very low prices. In Nails the cut rate freight mentioned last week was withdrawn, and now river freights from Pittsburgh and Wheeling are cut off, but on the top of this comes a general confidential shade in price made by some of the lower mills.

The new National Nail card has not served its purpose in preventing the list of extras being interfered with, as there are flagrant abuses by the regular mills, both on 10d. and fine Nails, and the Tack factories are still using their fine Nail machines to some purpose, and probably their inroads are what is causing such disorder among the regular mills. It is time to stop the present state of affairs, as the buyers are entirely demoralized, and the mills none the less so, but what is to cause a cessation is the great question.

Taken as a whole, the week has been a good one for the jobbers; satisfactory shipments have gone out, and they feel sure of getting full returns for the goods. F. F. GILMORE.

His Last Trip.

Wm. H. Maher, Toledo, Ohio, author of "A Man of Samples," contributes the following characteristic sketch:

Among the men who called regularly upon us for the past 20 years there was none for whom we had a warmer welcome than for Sam Parmelee. Good-natured, serene, thankful for an order, not cast down if he failed to get one; always saying amiable things of the other boys, and rarely staying as long as we wished. He had a fatherly interest in such youngsters as Chris. Morgan, Henry Hall and Tibballs. If they had secured the order for britanna spoons that he wanted, he good-humoredly promised to make it hot for them the next time, but always ended with a pleasant word for each and all.

When his concern secured a genuine "Rogers," Sam was fairly bubbling over with joy. He had been long enough with Tibballs & Munson to have learned by heart all there was to say about that talismanic silver-plated label, Rogers, and he beamed on you with unutterable happiness at being, at last, able to offer you Rogers's goods. What buyer does not remember his benignant "Personal Guarantee;" his confidential extra 5 per cent., and his surprise to find that Munson was doing a little better than that? Are not all these written down in the buyers' memories?

Late last fall, well toward December, if not in that month, the portly figure and well-known swinging gait of my old friend proclaimed his identity long before he reached me, but when we were shaking hands I saw his face was unusually happy. I was full of plated ware, so that our talk did not linger long over that, and I asked him why he looked so happy.

"It's my last trip," said he. "I've been on the road just 20 years."

"Is it that long?" I asked. I remembered his first appearance well, and I am beginning to think that 20 years roll by altogether too fast.

"Yes," said he, "just 20 years of it, and now I am going to quit the road. There are a lot of pleasant men in the trade, and I guess I have had about as easy a time as any man could have, but you can't imagine how glad I am to stop traveling."

"What in the world will you do?"

"Do? Why I have one of the nicest farms in the State of Connecticut, and I am going to have the best time on it any man ever had in this world. I want you to promise to stop off at Wallingford and visit me. If I don't give you a high old time then I'm mistaken."

"So you are not only going off the road but are going on a farm."

"Yes, sir! I am. There is no State in this world quite so nice as old Connecticut, and no place in that State equal to my farm. You just come and see it, and you will say so, too. I anticipate a great deal of pleasure in seeing some of my old friends in my own house."

"But you are not going to work."

"Oh," said he, laughing all over, "I'm going to work if I want to. After a man has traveled 20 years he is ready to do most anything for the privilege of staying at home and sleeping in his own bed. Lots of the men who were on the road when I began have gone to sleep in their graves. I began to feel as if that would be my fate if I didn't hurry, but now I've got it all fixed, and I'm there."

"So we won't see you as a drummer any more?"

"No, sir! this is my farewell tour. There have been a good many ups and downs in trade since I began; a good many business booms, and just as many periods when it was hard to give goods away. But since our folks got Rogers it has made him —"

"Oh, bother Rogers! let him go, this is your last trip, so you can afford to stick to facts."

"Why the fact is," and his honest old soul looked amazed that his 'facts' should be doubted, "its just as I say."

"Well, let it go; don't be a crank on Rogers any longer; let them continue to turn their own crank; when do you get through?"

"With the year. I shall be home in a week and will get out of harness by December 31. Then I'm going to fix up my place, and live as comfortable as an old horse in a clover lot. You'll come and see me, wont you? I shall get hold of Morgan and Hall every chance I have and make them tell me all about every man they saw. I expect there will be times when I'll be awful homesick for a grip sack and an order book, but I don't intend to have any more of it."

As we shook hands he added other invitations, and I accepted them all; when he repeated for the seventh time, as if it was the one joyful thought in his heart, "I shall just settle down and enjoy myself for the rest of my life."

I believe I was almost as glad for him as he seemed to be for himself. After he went out I sat there thinking of the changes 20 years had wrought, and many faces came before me of the men who had called on us, as Sam had, during that time. So very many of them were dead. Some of them, not many, were worse than dead; many of them were stay-at-homes now, in store or factory, seen occasionally, and always with pleasure, and many were still on the road. Not one of them deserved better of the world than did Sam, and as I turned to my work I said to myself, "I don't believe he leaves an enemy or a man with unfriendly feelings anywhere on his route."

By-and-by the other "boys" came around and had their jokes over Sam's "farewell appearance," every one of them sure that he deserved a happy old age, and that Fortune was sending her favors this time to the right person. During the holidays I had frequent occasion to go among the plated-ware stock; every time I saw the goods Sam came before me and his happy face at the good times within his reach. I was reminded of him again and again, for he was so well known many traveling men spoke of him.

I passed through Wallingford early in the year. It was a dreadfully unpleasant day, high winds and rains, and I smiled to myself as I thought of Sam watering his stock and having a good time. I looked the few men in the depot over carefully to see if perchance he might be among them. He was not there. He was, in my mind, in New York, and the first time I ran across a Wallingford man I said, with a laugh:

"I suppose Father Parmelee is taking solid comfort on that handsome farm of his. I hope the good soul will get all the comfort out of it he looks for."

"Why," said my friend, "haven't you heard? Sam was found dead in bed—died of heart disease. They buried him only yesterday."

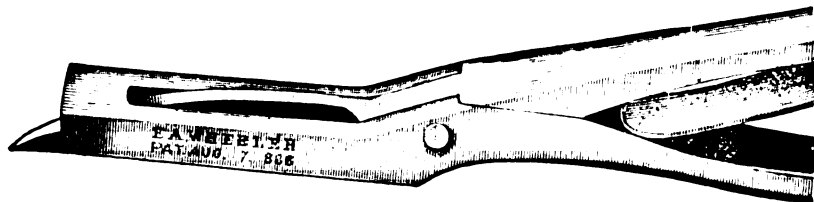
Water Meters.

We are indebted to Mr. John C. Kelly, president of the National Meter Company, 252 Broadway, New York, for a valuable book entitled, "Statistics, Tables and Water Rates of Cities and Towns," together with facts about water meters, compiled by the company of which he is president. The book is some 7 x 11 inches in size, well bound in cloth, and contains over 80 pages. In the introductory statement the publishers announce that, having frequently received inquiries from many of their correspondents for lists of water rates charged in various towns and cities, and for other information with reference to water supply in the use of meters, they have prepared a list and statement, made up from the most reliable data they were able to procure, and published them in this book, hoping they will prove interesting and useful to all who are concerned in the important question of water supply. They also state that they have introduced evidence establishing beyond question the utility and equity of the meter system, and refer briefly to the many advantages that come from using meters. The first 20 pages are devoted to cuts with descriptive text of the various styles of meters which they manufacture. Tabular statements and testimonials follow, after which come the four tables mentioned in the preface. These tables are printed on large sheets of paper, giving full lists of the water rates of all the large cities of the country. As reference tables, they will prove not only interesting, but exceedingly valuable to many people. The remainder of the pamphlet contains extracts of reports, statistical tables and miscellaneous information from various sources, the last thing to be noticed being the Crown Gas Pump manufactured by the same company. The National Meter Company are to be congratulated upon having brought out so valuable a trade publication, and we feel that all who are favored with copies will fully appreciate them.

Lignum-vitæ has long been used on the stern tubes of steam vessels and for other bearings exposed to considerable pressure. M. Stockhardt, of Leipzig, Germany, however, has recently patented a process of treating ordinary soft wood, so as to be fit for those purposes for which lignum-vitæ has hitherto been almost exclusively used.

The Wheeler Can Opener.

This tool differs from most of the can openers in common use, in embodying the principle of a pair of shears. Its invention grew out of an actual want of the inventor, whose business required the sampling of canned good. In opening cans containing

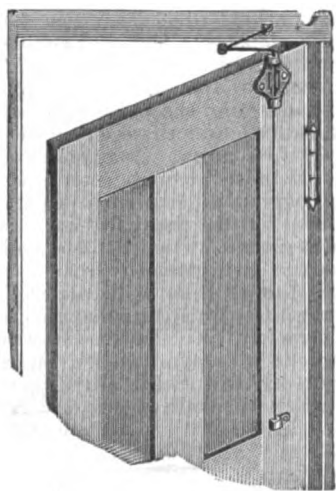


The Wheeler Can Opener.

solids, such as corned beef, tongue, salmon, fowl, &c., it was found that the contents were usually extracted in a mutilated and unsatisfactory condition as well as with great annoyance in labor and fear of injury to the hand. Under these circumstances the inventor sought to produce a practical instrument for his own use, and the result is the can opener which is here-with illustrated. It is drop-forged, and is thus made wholly of steel, with a fine cutting blade, which is an integral part of the tool, and is not merely welded to the handle and easily broken off. In using this instrument the blade is inserted on the side of the can just below the can head, first, with the handle closed, then, relaxing the grasp of the hand until the blade is fully inserted, the handles are held out from the can, so that the jaw of the shears will come in contact with the tin at the cutting angle. The cutting then proceeds as with a pair of shears until the top of the can is detached, or as nearly so as desired. Square or round cans are cut with equal ease, and the solids are removed in perfect form for sampling or table use. A clean cut edge is left on the body of the can, while the tin above is forced to bend over the inner corner of the companion bar of the shear into the slot, thus making an open pathway and preventing the tin from binding on the blade. This tool is offered to the public at the lowest price possible by the inventor, E. A. Wheeler, 922 Farnam street, Omaha, Neb.

The Peabody Door Spring.

The accompanying illustration represents the Peabody Door Spring, manufactured by A. W. Paine, Peabody, Mass.,



The Peabody Door Spring.

showing it in use attached to the door. The spring is described as consisting of Bessemer-steel spring wire 3 feet long. At one end a right angle is turned, with an arm $5\frac{1}{4}$ inches, to the end of which another piece of wire, 5 inches, is connected by a

rivet, which forms a hinge. On the free end of this piece a hook is turned which fastens into a screw eye in the casing over the door $\frac{1}{4}$ inch from the angle in the spring. As indicated in the illustration, the spring is placed on the door parallel with the hinges and about 3 inches from the same. The spring is so placed that

the arm works freely over the top of the door. The requisite power for closing the door is obtained from the torsion of the wire, which is got by turning the wire round in the socket toward the hinges as far as is desirable and placing the wedge in the socket, when, bringing the arm around and hooking it into the eye, the spring is ready for use. It is explained that the leverage obtained by the arm of the spring is greater at the latch than at any other point, so that the door is closed slowly until it is nearly shut, thus avoid-

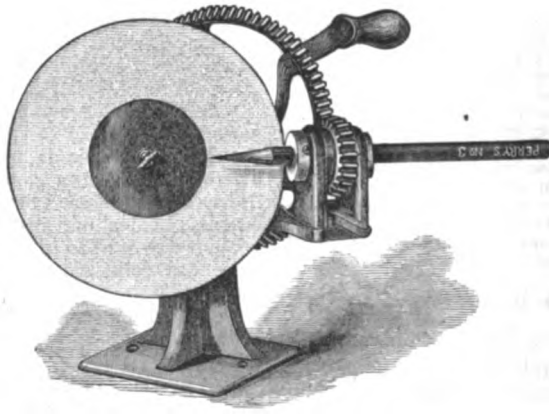
ing to a great extent the slamming of the door. The advantage of this article over other low-priced springs is thus alluded to. The spring is referred to as desirable for screen doors, as it can be very easily unhooked and the door put away. Its adaptation for other doors is also referred to. The springs are japanned and packed 1 gross in a case. One set of fixtures is packed in a box with directions, and a dozen sets of fixtures in a larger box. Two sizes are made, No. 1 for screen and house doors and No. 2 for store and heavy doors. The prices at which the goods are sold are referred to in the Trade Report.

In our description last week of the Electric Patent Pruner, just put upon the market by the Mechanics Mfg. Company, New Bedford, Mass., we omitted to say that the frame of the pruner is made of malleable iron, the cutter being of cast steel. The point is specially made in regard to it that it can be worked in less space than other pruners, as there are no long arms to project and interfere with the branches, and that it can be worked at a greater distance, as the hook will allow the operator to hang it on the limb to be cut, the limb thus taking the weight and relieving the operator of what would naturally be hard work.

The appraisers' conference recently held in this city sustained the previous appraisements at this port of steel wire rods, and crop ends from steel slabs were decided to be properly dutiable at 45 per cent.

The Gem Pencil Sharpener.

This simple and ingenious machine is represented in the accompanying illustration and is manufactured by Gould & Cook, Leominster, Mass. It is operated by means of a crank attached to a gear which intermeshes with two small pinions, which it rotates rapidly in opposite directions; one of these revolves the pencil holder and the other the metal disk, with which it is connected by a shaft. This disk is covered by a circular piece of sandpaper held in place by a thumb screw and washer. The chuck holder through which the pencil passes in the operation of sharpening is made to swing laterally by pressing upon the tail piece attached to it, thus keeping the end of the pencil against the sandpaper until the work is done. The operation of sharpening a pencil is thus very simple. It is pushed through the chuck, the end pressed against the disk, as described, when a few revolutions of the crank give the pencil as long and tapering a point as may be desired. A package of one dozen sandpaper disks is put up with each machine, additional packages being furnished, if desired, at a trifling expense. The diameter of the disk is about 6 inches. The weight of the machine, when boxed and ready for shipment, is 7 pounds. The points made by



The Gem Pencil Sharpener.

the manufacturers in regard to this machine are the following: That it sharpens equally well both slate and lead pencils; that it does not break the leads; that it is simple and easy to operate; that a long or short point or bevel can be obtained without altering the machine; that the chuck for holding the pencil is automatic, adjusting itself to pencils of any ordinary size; that it is compact and simple in construction and costs but little to keep in good working order, as it has neither knives, files or belts to replace when dull or worn out, but simply a circular piece of ordinary sandpaper, which can be cut out by any one. The adaptation of the machine for school use or for office purposes is obvious.

Never in the history of the country, says a Nevada paper, has there been so dry a season as the present. Streams in Alpine County which in past years have carried a good head of water are now as dry as a powder-house, and the Carson River has less water than ever was known at this time of the year. The loss to the mining interests and every one dependent upon river water for either motive power or irrigation is beyond compensation.

A syndicate of Northern and Southern gentlemen have closed a contract with the Cartersville Land Company and the Cartersville Furnace Company, at Cartersville, Ga., wherein they agree to erect an iron furnace and a ferromanganese furnace, to which they will apply the Pratt process for dephosphorizing the ores used.

The Canning Industry.

The vast importance of the canning industry of this country is fully realized by those only who are in some way connected with it. The fruit raisers and farmers who supply vegetable products to the canners appreciate in a measure the extent of the industry on which they depend, and some tin-plate importers are happily aware of the fact that large quantities of bright plates are annually consumed in the manufacture of cans. But from the general public the industry receives little attention. People buy and eat canned fruits, vegetables, meats and fish, foreign armies and navies are supplied with food packed in American canneries, and in every country of the globe the American traveler may glut his patriotism on eatables put up in the States. When

to have the largest and best equipped packing-houses, besides furnishing machinery to packers all over the country. Though California at present does not rank among the foremost States in this industry it is advancing rapidly, owing to its enormous and increasing production of fruits. We do not know whether this list includes the great meat-canning houses of Chicago and the West, but we should think that it would be in such establishments, rather than in those of Maine, that the best equipment and the most approved methods would be found.

Acme Evaporators.

The Steam Heat Evaporator Company, Charlotte, Mich., offer to the trade several forms of fruit dryers, or evaporators, two of which are illustrated in the cuts here-

illustration, all the fruit trays are readily accessible, and can be seen and reached from the floor without shifting. The arrangement of pipes is said to give a perfectly uniform degree of heat and an absolute immunity from danger from fire is claimed. The apparatus is very simple, and its capacity can be readily increased by the addition of steam coils. A final claim made by the manufacturers is that the fruit dried by this process is greatly superior to that dried by the hot-air process. In Fig. 2 a general illustration is shown of the No. 3 Acme Evaporator. The peculiarity of this apparatus is that no boiler is required. Its dimensions are 8 feet 2 inches high, 7 feet 3 inches wide, 9 feet 4 inches long; shaft, 16 x 16 inches; weight, 3400 pounds, and capacity from 70 to 190 bushels of apples in 24 hours.

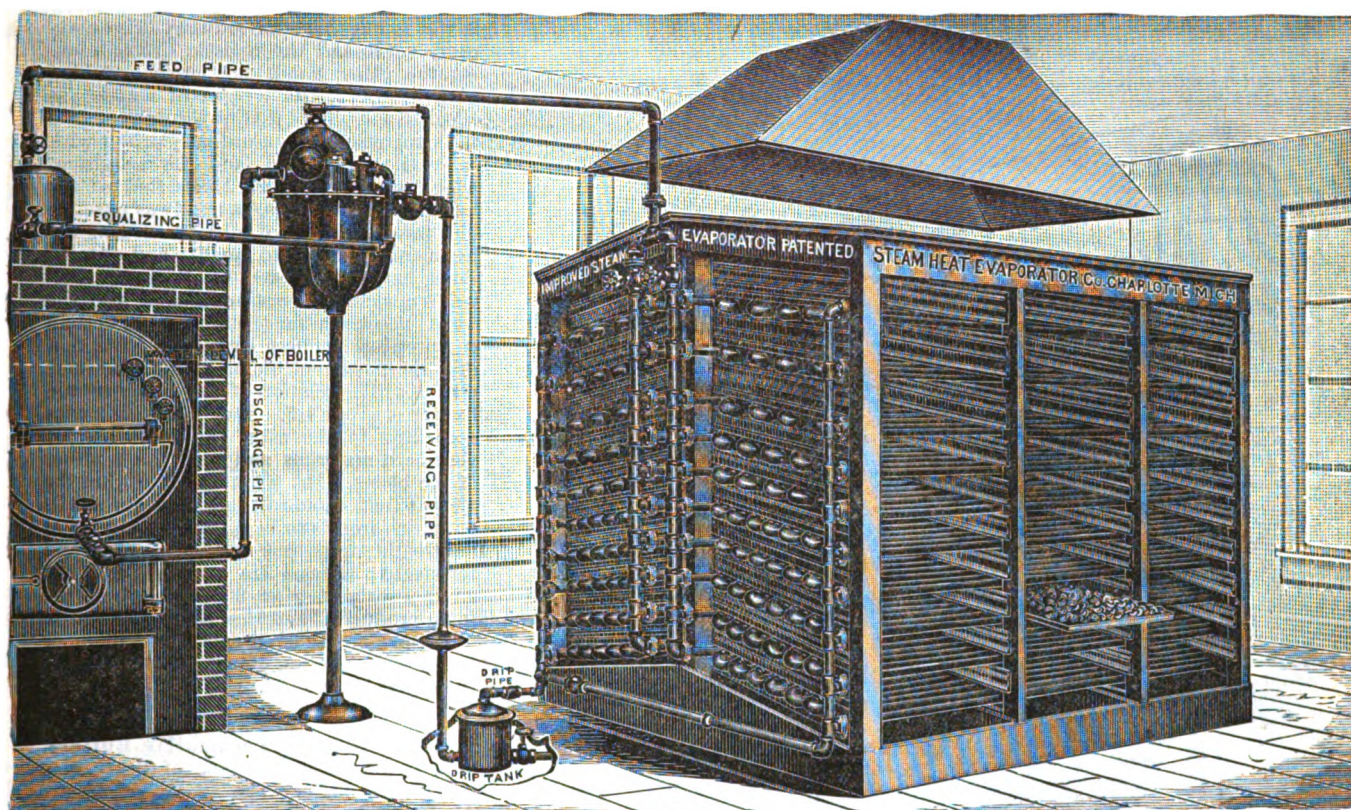


Fig. 1.—No. 9 Acme Steam Evaporator.

we thus consider the world-wide distribution of canned goods and the enormous quantities that are consumed at home and abroad, a general statement of the number of canneries in the United States will not cause the surprise it otherwise would. We regret not being able to present a list giving the number and location by States of all the canning establishments in the country, but unfortunately accurate statistics of the industry are not obtainable. In the absence of exact official information, however, it may be of interest to give some figures from a table that appeared in a New England paper not long since. According to this statement there are 1350 packing-houses in the United States, but from other sources we learn that the actual number is probably not so great, though the statement may refer to all kinds of packing-houses. In the classification by States Maryland is far in the lead, being credited with 634 establishments, of which 127 are in Baltimore alone. Maine follows with 134, then New York with 127, after which come Michigan, California, New Jersey, Ohio, Oregon, Massachusetts and Delaware, in the order named, each of which has over 30 such factories. Maine is said

with given. Fig. 1 shows their No. 9 Acme Steam Evaporator. The apparatus is 9 feet 4 inches long, 8 feet 6 inches wide, 8 feet high, and weighs 6600 pounds, with a guaranteed capacity of 250 bushels of apples per 24 hours. For operating this apparatus it is recommended that boilers of not less than 15 horse-power be used. The apparatus consists of a succession of steam chambers constructed of steam-pipes, placed one above the other, room being left between them for the introduction of the galvanized wire fruit trays. The condensed water from the steam-pipes is returned to the boiler by means of a return steam trap, which is provided with the machine. The trap returns the water hot to the boiler, thus economizing the heat as much as possible. The manufacturers make reference to the fact that as the water is used over and over again, instead of fresh supplies being provided, there is little danger of boiler scale forming. A special feature to which attention is directed is the comparatively small size of this apparatus and its relatively large capacity. Whenever desired, one-half of the machine can be used at a time, the other half being disconnected. As will be noticed by reference to the

As shown in the illustrations the furnace is at the side, but, as at present manufactured, the apparatus has the furnace at the end. The heating is done with hot water, the heat from the furnace passing through the fruit in such a manner as to carry away the moisture without the danger of scorching the fruit. It has 14 hot-water chambers made of steel thoroughly stayed, which are steam and water tight, and, it is said, ought to last indefinitely. These chambers are filled with hot water by a continuous current of even pressure which imparts a uniform heat and secures even drying. They are placed at considerable distances one above the other, and the whole is inclosed in a shell as shown in the illustration. In both sides of this shell are doors through which the fruit trays are inserted upon ways or slides, each tray by itself. Within the furnace (underneath) is a large coil of iron pipe which heats the circulating water. The reservoir connected with the lower portion of the coil keeps the chamber filled with water. As the moisture is expelled from the fruit it is carried away without coming in contact with other fruit, and it is pointed out, furthermore, that the heat is applied both at top and bottom, so that the fruit is dried on

both sides simultaneously. When in use there is a constant flow of vapor through the drying chambers into the space between the tiers, and then up through the hood and flue above it. It is said that no moisture escapes into the room during the operation. The furnace is of an improved pattern, adapted to either coal or wood, and is said to be carefully secured against cracking. The trays are of galvanized wire cloth. A relief pipe is provided which carries away any steam that may be formed and also prevents the possibility of any pressure. While the machine is adapted for all kinds of work, it is especially recommended for drying berries and small fruits. The merits of this apparatus are

cost in the neighborhood of \$700,000 and an effort will be made to complete it within 15 months. This move means the development of an enormous water power and will result in making the Soo a manufacturing city of considerable importance in a short time. Letters of inquiry are being received from manufacturers and 1000 horse-power has already been contracted for. The canal will be three miles long.

Hammers and Anvils.

Prof. F. Kick has published in the *Technische Blätter* an interesting account

of the experiments he has made on this subject. The difference between static pressure and that which results from a shock consists, he says, in the duration of their action. The weight of the hammer and the height of the fall determine the total energy expended, but the power of the shock for a given expenditure of energy itself depends on the compression produced in the object struck. The feebleness of this compression is the greater the relative force of the blow to the pile. He has made some comparative experiments between the effects produced by an ordinary pile-driver striking upon an anvil solidly fixed, and by a ballistic hammer, where the driver and anvil are both suspended like pendulums, so that the anvil is free to move. He has found that within rather large limits the work employed in the deformation of an object under the action of the shock only depends upon the product of the weight of the driver and the height of the fall for

heights varying from 0.50 to 3 m. The test pieces were small copper cylinders, fitted on to the same rod, and of the same initial dimensions, 16.9 mm. long, 12 mm. in diameter, and weighing 18.4 grams. One of the series was submitted to the action of an ordinary driver, and the other to that of a ballistic driver, taking care to obtain equal shocks under the two conditions. The weight of the anvil of the ballistic driver was to that of the driver in the proportion of two to one. The experiments have shown that a greater deformation is obtained by the ordinary than by the ballistic drivers, all other things being equal. With the latter a calculation of the proportion of force transmitted to it can easily be made, and it was found that 30 per cent. of energy was expended. Other experiments made with the same apparatus have enabled the necessary energy of both to be determined on analogous *eprouvettes*. It was found that the ordinary driver expends seven and the ballistic driver nine. On the other hand, the latter provided with an anvil, the weight of which was equal to four times that of the driver, gave the same results as an ordinary driver with an anvil firmly fixed, and the weight of which was equal to 20 times that of the hammer. Test-pieces, as nearly as possible like those made use of in the preceding experiments, both as to quality and dimensions, have been tested by Professor Golinier's machine for testing metals, and the work necessary for obtaining a certain compression has been compared with that of a shock susceptible of giving the same results. The relation of the latter to the former is about 1.5. But this value varies according to the case, and increases for very hard materials and with the number of the blows. Mr. Kick estimates that the weight that should be adopted for anvils on which iron is to be forged should be at least eight times that of the hammer, and for steel 12 times. He considers that the anvil absorbs at least 20 per cent. of the force produced, and that the rest is lost in vibrations of the anvil and of the hammer and in the elevation of the temperature of the object to be forged.

Cost of Draft in Locomotive Boilers.

—In an article on the cost of draft in a locomotive boiler, the *Railway Master Mechanic* assumes that, because "it is not uncommon to have a back pressure in a locomotive cylinder of 7 pounds per square inch, the unnecessary, or rather undesirable, loss due to the compulsory back pressure to blow the fires" is the whole of this 7 pounds, and calculates as follows: "We will assume an 18 x 24 inch locomotive to be running at 50 miles per hour; the driving-wheels to be 5½ feet in diameter; the revolutions per mile, including slippage, to be about 300; the revolutions per minute to be $50 \times 300 \div 60 = 250$; and the piston speed in feet per minute to be $250 \times 8 = 2000$ feet for both cylinders. During this 2000 feet the piston is working 1½ feet for each 2 feet against 7 pounds pressure per square inch. That is equal to three-fourths of the distance, or 1500 feet. The area of an 18-inch piston is 254 square inches; the horse-power is then $254 \times 7 \times 1500 \div 33,000 = 80$ horse-power. This is only an approximation to the average case, yet it is the condition under which many locomotives work."

The contract for the construction of the new naval observatory on Georgetown Heights has been awarded to P. H. McLaughlin & Co., of Washington, at their bid of \$307,811. This is exclusive of domes and piers, which will be constructed by the Government. The building is to be completed within 18 months, and is to be constructed of Tuckahoe marble.

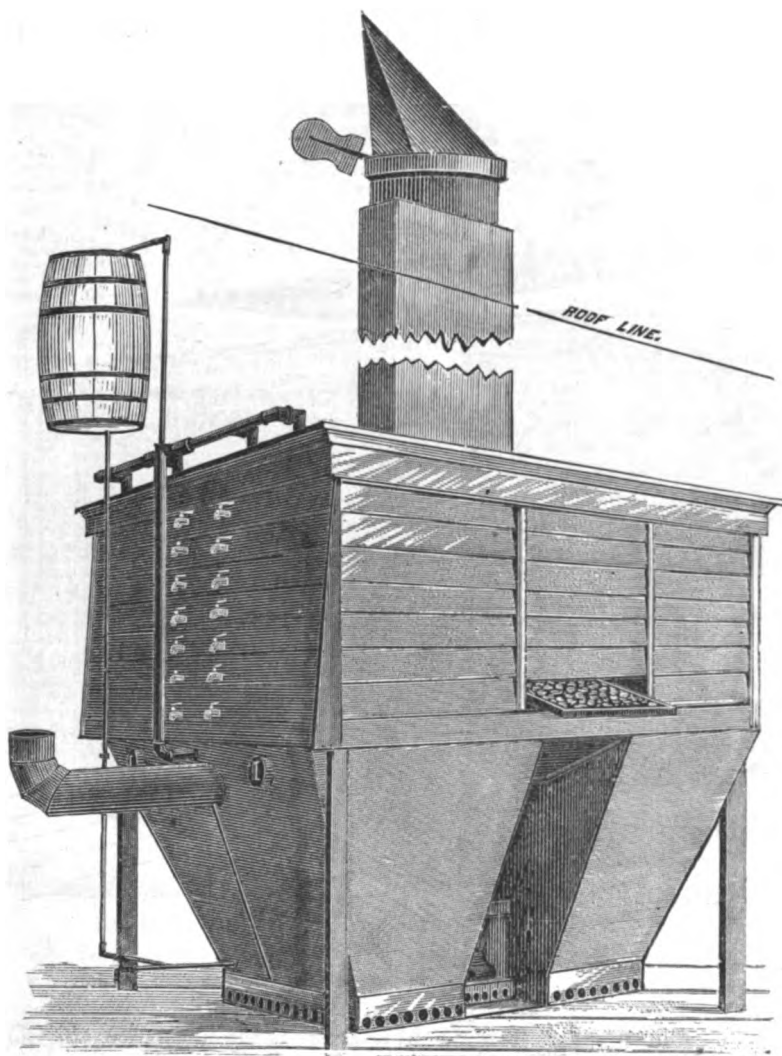


Fig. 2.—No. 3 Acme Evaporator.

referred to in a number of letters from those who have used it with the most satisfactory results.

The Sault Ste. Marie Water-Power Canal.—At a citizens' mass meeting held at Sault Ste. Marie, Mich., on the 3d inst., \$12,000, the remainder of the sum necessary to insure the commencement of work upon the great water-power canal, was raised. This makes \$100,000 raised by the citizens of Sault Ste. Marie, for which they receive from the water-power company \$200,000 in stock. The company agree to put up a like amount and to begin the work of construction within 20 days. The plans and specifications for the canal are now in the hands of the contractors, and as the water-power people were only awaiting the result of the Soo's endeavor to secure the sum required, there will be no delay in beginning the work and pushing it on to completion. The canal will

be three miles long. The cost in the neighborhood of \$700,000 and an effort will be made to complete it within 15 months. This move means the development of an enormous water power and will result in making the Soo a manufacturing city of considerable importance in a short time. Letters of inquiry are being received from manufacturers and 1000 horse-power has already been contracted for. The canal will be three miles long.

AUGUST 8, 1888.

Appendix

Wrought B.&F.ush. Com'n Stanley's list, dis 65&10%

Sprague, No. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 1039

World's Best, # gross, No. 1, \$12.00; No. 2, \$84.00	
No. 3, \$80.00	
Universal	dos \$8.00, dis 35&5
Domestic	dos \$2.50, dis 45
Champion	dos \$2.00, dis 50
Cards.	
Horse and Curry	dis 10&10 @ 10&10&10
Ottoman	New list, Aug. 1888, dis 10 @ 10&10
Wool	dis 10 @ 10&10
Carpet Stretchers.	
Cast Steel, Polished	dos \$2.25
Cast Iron, Steel Points	dos \$0.40
Socket	dos \$1.75
Ballard's	dis 25 @ 25&10
Carpet Sweepers.	
Bissell No. 5	dos \$17.00
Bissell No. 7 New Drop Pan	dos \$19.00
Bissell Grand	dos \$36.00
Grand Rapids	dos \$24.00
Crown Jewel	No. 1, \$18; No. 2, \$19; No. 3, \$20
Magic	dos \$15.00
Jewel	dos \$12.00
Mystic	dos \$15.00
Ottage	dos \$15.00
Garland	dos \$18.00
Parlor Queen	dos \$24.00
Housewife's Delight	dos \$15.00
Queen	dos \$16.00
Queen, with band	dos \$20.00
King	dos \$18.00
Weed Improved	dos \$16.00
Hab	dos \$16.00
Cog Wheel	dos \$16.00
Cartridges.—See Ammunition.	
Casters.	
Bed	New list
Flat	dis 55 @ 55&5
Shallow Sockets	Others, dis 60 @ 60&5
Deep Socket	dis 10 @ 10&5
Yale Casters, list May, 1884	dis 30&10 @ 40
Yale, Gem	dis 60 @ 60&5
Martin's Patent (Phoenix)	dis 45&10 @ 50
Payson's Anti-Friction	dis 60 @ 60&10
"Giant" Casters	dis 10 @ 10&5
Stationary Truck Casters	dis 45&10
Cattle Loaders.	
Humason, Beckley & Co.'s	dis 70
Sargent's	dis 60&10
Wetckies	dis 30
Peck, Stow & W. Co.	dis 50&10
Chain.	
Trace, 6-10-2, exact sizes, # pair, \$1.05	dis 50&10&5
Trace, 6-10-8, exact sizes, # pair, .92	dis 50
Trace, 7-10-2, exact sizes, # pair, 1.11	dis 50
Norw.—Traces, "Regular" sizes 35 net # pair less than exact	
Log, Fifth, Stretcher, and other fancy Chains, list Nov. 1, 1884	dis 50&10 @ 50&10&5
American Coil 3-16	dis 7-15 @ 4
In case lots, 8.75 6.25 5.00 4.50 4.00 3.75 3.50	
Less than case lots, add 1/4¢ per lb	
German Coil, list of June 20, 1887	dis 50&10&5 @ 60
Ger. Halter Chain, list of June 20, 1887	dis 50&10&5 @ 60
Covert Halter, Hitching and Breast.	dis 50&5
Covert Tractor	dis 50&5
Onida Halter Chain	dis 60 @ 60&5
Galvanized Pump Chain	dis 6 @ 6&4
Jack Chain, Iron	dis 70&10 @ 75
Jack Chain, Brass	dis 65 @ 70
Chalk.	
White	gro 50
Red	gro 70
Blue	gro 85
White Crayons	gro 125 @ 125
Chalk Lines.—See Lines.	
Chisels.	
Socket Framing and Firmer.	
P. S. & W. and Middlesex	dis 75&5
Mix	dis 75&10
Buck Bros.	dis 30
Merrill	dis 60&10 @ 60&10&5
L. & I. J. White	dis 30 @ 30&5
Witherby and Douglass	dis 75 @ 75&5
Tanged Firmers	dis 40&10
Tanged Firmers, Hatchers	\$4.75 @ 50
Tanged Firmers, Speer & Benson	dis 50 @ 50
Tanged Firmers, Buck Bros.	dis 30
Cold Chisels, #	dis 16 @ 16
Chucks.	
Seach Patent	each, \$5.00, dis 30
Morse's Adjustable	each, \$7.00, dis 20 @ 30&5
Sanbury	each, \$6.00, dis 30 @ 30&5
Syracuse, Bais Pat.	dis 25
Clamps.	
Providence Tool Co.'s Wrought Iron	dis 25
Adjustable, Gray's	dis 30
Adjustable, Lambert's	dis 20
Adjustable, Snow's	dis 40&5
Adjustable, Hammer's	dis 10
Adjustable, Otis	dis 20&10
Stearns' Adjustable Cabinet and Corner	dis 20&10
Cabinet, Sargent's	dis 60&10
Carriage Makers', Sargent's	dis 60&10
Bernard Mfg. Co.	dis 40&5 @ 40&10
Warner's	dis 40&10 @ 40&10&5
Crow Clamps.	See Vices
Crow.	
Norway, Axle, 4 & 5-16	dis 55&5
Second grade Norway Axle, 4 & 5-16	dis 55&5
Superior Axle Clips	dis 60&5 @ 60&5&5
Norway Spring Bar Clips, 5-16	dis 60&5&5
Wrought-iron Felloe Clips	dis 55
Steel Felloe Clips	dis 55
Baker Axle Clips	dis 55
Keyways	dis 50
Cocks, Brass.	
Hardware list	dis 40&10&5
Coffee Mills.	
Box and Side, list revised Jan. 1, 1888	dis 50&2
American, Enterprise Mfg. Co.	dis 30&10 @ 30
The "Swift" Lane Bros	dis 30&10
Compasses, Dividers, &c.	
Compasses, Calipers, Dividers	dis 70 @ 70&10
Bemis & Call Co.'s Dividers	dis 60&5
Bemis & Call Co.'s Compasses & Calipers	dis 50&5
Bemis & Call Co.'s Wing & Inside or Outside	dis 60&5
Bemis & Call Co.'s Double	dis 60
Bemis & Call Co.'s (Call's Patent Inside)	dis 30
Excelsior	dis 50
J. Stevens & Co.'s Calipers and Dividers	dis 30&10
Coppers' Tools.	
Bradley's	dis 20
Baron's	dis 20 @ 20&5
L. & I. J. White	dis 20&5
Albertson Mfg. Co.	dis 25
Beatty's	dis 40 @ 40&5
Sandusky Tool Co.	dis 30 @ 30&5
Corkscrews.	
Humason & Beckley Mfg. Co.	dis 40 @ 40&10
Clough's Patent	dis 35 @ 35&5
Howe Bros. & Hulbert	dis 35
Crow Knives and Cutters.	
Bradley's	dis 10
Wadsworth's	dis 25
Cradles.—Grain.	dis 50&10
Crow Bars.	
Cast Steel	dis 45
Iron, Steel Points	dis 34
Crow Combs.	
Fitch's	dis 50&10 @ 50&10&10
Rubber	dos \$19.00, dis 20
Perfect	dis 50

Curtain Pins.	
Silvered Glass	dis 25
White Enamel	dis 25
Cutlery.	
Beaver Falls and Booth's	dis 33&4
Wootenholme	\$7.75 to \$
Dampers, &c.	
Dampers, Buffalo	dis 50
Buffalo Dampers	dis 50
Crown Dampers	dis 50
Excelsior	dis 40&10
Dividers.—See Compasses.	
Dog Collars.	
Embossed Gift, Pope & Stevens' list	dis 30&10
Leather, Pope & Stevens' list	dis 40
Brass, Pope Stevens' list	dis 40
Door Springs.	
Torrey's Rod, regular size	dis 1.30
Gray's	dis 20
Bee Rod	dis 20
Warner's No. 1	dis 25.50; No. 2, \$3.30; dis 40&10&5
Gem Coll, list April 19, 1884	dis 10
Star Coll, list April 19, 1884	dis 10
Victor Coll	dis 50 @ 50&10
Champion Coll	dis 60&10 @ 60&10&10
Philadelphia	dis 50 @ 50
Cowell's	No. 1, \$1.00; No. 2, \$1.50, dis 50
Rubber, complete	dis 50 @ 50
Hercules	dis 50
Shaw's Door Check and Spring	dis 25 @ 30 @ 35
Elliot's Door Check and Spring	dis 25
Drawing Knives.	
P. S. & W.	dis 75&5
Mix	dis 75&10
New Haven and Middlesex	dis 60&10&10
Merrill	dis 60&10&10
Witherby and Douglass	dis 75 @ 75&5
Watson	dis 15&10 @ 25
L. & I. J. White	dis 15&10 @ 25
Bradley's	dis 35
Adjustable Handle	dis 25 @ 25&5
Wilkinson's Folding	dis 25 @ 25&5
Drills and Drill Stocks.	
Blacksmith's Self Feeding	each, \$7.50
Breast, P. S. & W.	dis 40&10
Breast, Wilson's	dis 30&5
Breast, Miller's Falls	each, \$3.00, dis 25
Breast, Bartholomew's	each, \$2.50, dis 25&10 @ 40
Ratchet, Merrill's	dis 30 @ 30 & 5
Ratchet, Ingersoll's	dis 30 @ 30&5
Ratchet, Parker's	dis 30 @ 30&5
Ratchet, Whitney's	dis 20&10
Ratchet, Weston's	dis 20&10
Ratchet, Moore's Triple Action	dis 25 @ 30
Whitney's Hand Drill, Plain, \$11.00, Adjustable	dis 20&10
Wilson's Drill Stocks	dis 10
Automatic Boring Tools	each, \$1.75 @ \$1.50
Drill Bits.	
Morse	dis 50&10&5
Standard	dis 50&10&5
Syracuse	dis 50&10&5
Cleveland	dis 50&10&5
Williams	dis 50&10&5
Drill Bits.—See Augers and Bits.	
Drill Chucks.—See Chucks.	
Dripping Pans.	
Small sizes	dis 10 @ 10
Large sizes	dis 10 @ 10
Egg Beaters.	
National	dis 25
Family (T. & S. Mfg. Co.)	dis 25
Standard (Standard Co.)	dis 25
Kingston (Standard Co.)	dis 25
Acme (Standard Co.)	dis 25
Duplex (Standard Co.)	dis 25
Rival (Standard Co.)	dis 25
Triumph (T. & S. Mfg. Co.)	dis 25
Advance No. 1	dis 25
Advance No. 2	dis 25
Bryant's	dis 25
Ayres' Spiral	dis 25
Double (Hamblin & Russell Mfg. Co.)	dis 25
Kay (Hamblin & Russell Mfg. Co.)	dis 25
Triple (Hamblin & Russell Mfg. Co.)	dis 25
Spiral (Hamblin & Russell Mfg. Co.)	dis 25
Paine, Dietl & Co's	dis 25
Egg Poachers.	
Buffet Steam Egg Poachers, # doz., No. 1, \$3.00; No. 2, \$2.00	
Electric Bell Metal.—Wollensak's	dis 15
Bigelow & Dowse	dis 20
Emery.	
No. 4 to 40 gr.	dis 150 gr.
No. 40 to 60 gr.	dis 150 gr.
No. 60 to 80 gr.	dis 150 gr.
No. 80 to 100 gr.	dis 150 gr.
No. 100 to 120 gr.	dis 150 gr.
No. 120 to 150 gr.	dis 150 gr.
No. 150 to 180 gr.	dis 150 gr.
No. 180 to 200 gr.	dis 150 gr.
No. 200 to 220 gr.	dis 150 gr.
No. 220 to 240 gr.	dis 150 gr.
No. 240 to 260 gr.	dis 150 gr.
No. 260 to 280 gr.	dis 150 gr.
No. 280 to 300 gr.	dis 150 gr.
No. 300 to 320 gr.	dis 150 gr.
No. 320 to 340 gr.	dis 150 gr.
No. 340 to 360 gr.	dis 150 gr.
No. 360 to 380 gr.	dis 150 gr.
No. 380 to 400 gr.	dis 150 gr.
No. 400 to 420 gr.	dis 150 gr.
No. 420 to 440 gr.	dis 150 gr.
No. 440 to 460 gr.	dis 150 gr.
No. 460 to 480 gr.	dis 150 gr.
No. 480 to 500 gr.	dis 150 gr.
No. 500 to 520 gr.	dis 150 gr.
No. 520 to 540 gr.	dis 150 gr.
No. 540 to 560 gr.	dis 150 gr.
No. 560 to 580 gr.	dis 150 gr.
No. 580 to 600 gr.	dis 150 gr.
No. 600 to 620 gr.	dis 150 gr.
No. 620 to 640 gr.	dis 150 gr.
No. 640 to 660 gr.	dis 150 gr.
No. 660 to 680 gr.	dis 150 gr.
No. 680 to 700 gr.	dis 150 gr.
No. 700 to 720 gr.	dis 150 gr.
No. 720 to 740 gr.	dis 150 gr.
No. 740 to 760 gr.	dis 150 gr.
No. 760 to 780 gr.	dis 150 gr.
No. 780 to 800 gr.	dis 150 gr.
No. 800 to 820 gr.	dis 150 gr.
No. 820 to 840 gr.	dis 150 gr.
No. 840 to 860 gr.	dis 150 gr.
No. 860 to 880 gr.	dis 150 gr.
No. 880 to 900 gr.	dis 150 gr.
No. 900 to 920 gr.	dis 150 gr.
No. 920 to 940 gr.	dis 150 gr.
No. 940 to 960 gr.	dis 150 gr.
No. 960 to 980 gr.	dis 150 gr.
No. 980 to 1000 gr.	dis 150 gr.
Enamelled and Tinned Ware.—See Hollow Ware.	
Escutcheons.	
Iron, list Nov. 11, 1885	dis 50&10 @ 50&10&5
Brass	dis 60 @ 60&5
Escutcheons.	
Door Lock	Same discounts as Door Locks
Brass Thread	dis 60 @ 60&10
Wood	dis 25
Faucets.	
Fenn's Patent Rubber Ball	dis 40
Fenn's Cork Stops	dis 35
Star	dis 60 @ 60&5
Fray's Patent Petroleum	dis 40&10&5
West's Patent Key	dis 60&10
Anchor Lock	dis 45
Metallic Key, Leather Lined	dis 60&10 @ 60&10&10
Cork Lined	dis 75 @ 75&10
Burnside's Red Cedar	dis 50
Burnside's Red Cedar, bbl. lots	dis 50&10
J. Sommer's Best Block Tin Key	dis 40
J. Sommer's Cork Lined, 1st quality	dis 50
J. Sommer's Diamond Lock	dis 40
J. Sommer's Perfection, Fin. Red Cedar	dis 50
J. Sommer's Goodenough Cedar	dis 60
Self-Measuring, Enterprise	dis 30 @ 30&10
Self-Measuring, Lane's	dis 30 @ 30&10
Self-Measuring, Victor	dis 30 @ 30&10
Felloe Plates.	dis 50 @ 50
Fifth Wheels.—Derby and Cincinnati	dis 45&5
Files.	
Nicholson Files, Rasps, &c	dis 60&5 @ 60&10
Nicholson (X. F.) Files	dis 25
Nicholson's Royal Files (Seconds)	dis 75 (extra prices on certain sizes)
Other makers, best brands	dis 60&5 @ 60&10&5
Fair brands	dis 60&10 @ 60&10&10
Second quality	dis 70&5 @ 70
Heller's Horse Rasps	dis 50&10 @ 50&10&10
McClaffrey's Horse Rasps	dis 50&10
Imported.	
J. & Riley Carr	List, April 1, 1883, dis 15
J. & Riley Carr Horse Rasps	dis 15
Moss & Gamble	List April 1, 1883, dis 15
Butcher's	dis 15
Stubs	dis 25 @ 25
Turton's	Turton's list, dis 25 @ 25
Greaves' Horse Rasps	American list, dis 60

Filing Machines.	
Knox, 4-1/2-inch Rolls	dis 25 each
Knox, 6-inch Rolls	dis 30 each
Eagle, 3-1/2-inch Roll	dis 25
Eagle, 5-1/2-inch Roll	dis 35
Crown, 4-1/2 in. \$3.50; 6 in. \$4.00; 8 in. \$5.00 each, dis 25	
Crown Jewel	dis 25
American, 5-1/2 in. \$3; 6 in. \$3.40; 7 in. \$4.50 each, dis 25	
Domestic Filer	dis 25
Geneva Hand Filer, White Metal	dis 12, dis 25
Crown Hand Filer, No. 1, \$15; 2, \$12.50; 3, \$10.00	
Shepard Hand Filer, No. 85	dis 15, dis 40
Shepard Hand Filer, No. 95	dis 11, dis 40
Shepard Hand Filer, No. 95	dis 11, dis 40
Combined Filer and Sled Iron	dis 15, dis 20
Buffalo	dis 10.00, dis 15
Filing Scissors.	dis 45
Fly Traps.	
Paragon	dis 1.50 @ 1.75
Fodder Squeezers.	
Blair's	dis 20
Blair's, "Climax"	dis 1.25
Ferns—Hay, Manure, &c. Asso. list	dis 60&5
Ferns—Hay, Manure, &c. Phila. list	dis 60 @ 60&5
Placed, see above	
Frederick, Ice Cream	dis 60&10&5
Buffalo Champion	dis 60&10&5
Shepard's Lightning	dis 60
White Mountain	dis 60
Fruit and Jelly Presses.	
Enterprise Mfg. Co.	dis 30&10 @ 30
Penis & Co	dis 4.50
P. D. & Co	dis 4.50
Shepard's Queen City	dis 40
Fry Pans.	
High List	dis 75&5 @ 75&10&5
No. 0 1 2 3 4 5 6 7 8 9	
Low List	dis 70&10
No. 0 1 2 3 4 5 6 7 8 9	
Fry Pan	dis 1000
Common Hemp Fuse, for dry ground	dis 2.75
Common Cotton Fuse, for dry ground	dis 2.50
Single Taped Fuse, for wet ground	dis 4.75
Double Taped Fuse, for very wet ground	dis 7.25
Triple Taped Fuse, for very wet ground	dis 7.50
Small Gutta Percha Fuse, for water	dis 7.50
Large Gutta Percha Fuse, for water	dis 12.00
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Marking Mortise, &c	dis 60&10
Wire, low list	dis 10&10
Wire, Wheeler, Madden & Co.	dis 10
Wire, Morse's	dis 50 @ 50&5
Wire, Brown & Sharpe's	dis 10 @ 20
Gimlets, Nail and Spike	dis 50&10&5
"Eurek" Gimlets	dis 40&10
"Diamond" Gimlets	dis 35
Double Cut, Shepardson's	dis 45 @ 45&5
Double Cut, Ives	dis 60 @ 60&5
Double Cut, Douglass	dis 40&10
"Ree"	dis 25 @ 25&5
"Line"—Le Page's Liquid	dis 25 @ 35
W. N. Le Page's Improved Liquid Glue	dis 25 @ 25&5
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Tinned and Enamelled	dis 40&5 @ 40&10
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No. 30, \$32; No. 30 1/2, \$32.50; No. 31, \$33; No. 31 1/2, \$33.50; No. 32, \$34; No. 32 1/2, \$34.50; No. 33, \$35; No. 33 1/2, \$35.50; No. 34, \$36; No. 34 1/2, \$36.50; No. 35, \$37; No. 35 1/2, \$37.50; No. 36, \$38; No. 36 1/2, \$38.50; No. 37, \$39; No. 37 1/2, \$39.50; No. 38, \$40; No. 38 1/2, \$40.50; No. 39, \$41; No. 39 1/2, \$41.50; No. 40, \$42; No. 40 1/2, \$42.50; No. 41, \$43; No. 41 1/2, \$43.50; No. 42, \$44; No. 42 1/2, \$44.50; No. 43, \$45; No. 43 1/2, \$45.50; No. 44, \$46; No. 44 1/2, \$46.50; No. 45, \$47; No. 45 1/2, \$47.50; No. 46, \$48; No. 46 1/2, \$48.50; No. 47, \$49; No. 47 1/2, \$49.50; No. 48, \$50; No. 48 1/2, \$50.50; No. 49, \$51; No. 49 1/2, \$51.50; No. 50, \$52; No. 50 1/2, \$52.50; No. 51, \$53; No. 51 1/2, \$53.50; No. 52, \$54; No. 52 1/2, \$54.50; No. 53, \$55; No. 53 1/2, \$55.50; No. 54, \$56; No. 54 1/2, \$56.50; No. 55, \$57; No. 55 1/2, \$57.50; No. 56, \$58; No. 56 1/2, \$58.50; No. 57, \$59; No. 57 1/2, \$59.50; No. 58, \$60; No. 58 1/2, \$60.50; No. 59, \$61; No. 59 1/2, \$61.50; No. 60, \$62; No. 60 1/2, \$62.50; No. 61, \$63; No. 61 1/2, \$63.50; No. 62, \$64; No. 62 1/2, \$64.50; No. 63, \$65; No. 63 1/2, \$65.50; No. 64, \$66; No. 64 1/2, \$66.50; No. 65, \$67; No. 65 1/2, \$67.50; No. 66, \$68; No. 66 1/2, \$68.50; No. 67, \$69; No. 67 1/2, \$69.50; No. 68, \$70; No. 68 1/2, \$70.50; No. 69, \$71; No. 69 1/2, \$71.50; No. 70, \$72; No. 70 1/2, \$72.50; No. 71, \$73; No. 71 1/2, \$73.50; No. 72, \$74; No. 72 1/2, \$74.50; No. 73, \$75; No. 73 1/2, \$75.50; No. 74, \$76; No. 74 1/2, \$76.50; No. 75, \$77; No. 75 1/2, \$77.50; No. 76, \$78; No. 76 1/2, \$78.50; No. 77, \$79; No. 77 1/2, \$79.50; No. 78, \$80; No. 78 1/2, \$80.50; No. 79, \$81; No. 79 1/2, \$81.50; No. 80, \$82; No. 80 1/2, \$82.50; No. 81, \$83; No. 81 1/2, \$83.50; No. 82, \$84; No. 82 1/2, \$84.50; No. 83, \$85; No. 83 1/2, \$85.50; No. 84, \$86; No. 84 1/2, \$86.50; No. 85, \$87; No. 85 1/2, \$87.50; No. 86, \$88; No. 86 1/2, \$88.50; No. 87, \$89; No. 87 1/2, \$89.50; No. 88, \$90; No. 88 1/2, \$90.50; No. 89, \$91; No. 89 1/2, \$91.50; No. 90, \$92; No. 90 1/2, \$92.50; No. 91, \$93; No. 91 1/2, \$93.50; No. 92, \$94; No. 92 1/2, \$94.50; No. 93, \$95; No. 93 1/2, \$95.50; No. 94, \$96; No. 94 1/2, \$96.50; No. 95, \$97; No. 95 1/2, \$97.50; No. 96, \$98; No. 96 1/2, \$98.50; No. 97, \$99; No. 97 1/2, \$99.50; No. 98, \$100; No. 98 1/2, \$100.50; No. 99, \$101; No. 99 1/2, \$101.50; No. 100, \$102; No. 100 1/2, \$102.50; No. 101, \$103; No. 101 1/2, \$103.50; No. 102, \$104; No. 102 1/2, \$104.50; No. 103, \$105; No. 103 1/2, \$105.50; No. 104, \$106; No. 104 1/2, \$106.50; No. 105, \$107; No. 105 1/2, \$107.50; No. 106, \$108; No. 106 1/2, \$108.50; No. 107, \$109; No. 107 1/2, \$109.50; No. 108, \$110; No. 108 1/2, \$110.50; No. 109, \$111; No. 109 1/2, \$111.50; No. 110, \$112; No. 110 1/2, \$112.50; No. 111, \$113; No. 111 1/2, \$113.50; No. 112, \$114; No. 112 1/2, \$114.50; No. 113, \$115; No. 113 1/2, \$115.50; No. 114, \$116; No. 114 1/2, \$116.50; No. 115, \$117; No. 115 1/2, \$117.50; No. 116, \$118; No. 116 1/2, \$118.50; No. 117, \$119; No. 117 1/2, \$119.50; No. 118, \$120; No. 118 1/2, \$120.50; No. 119, \$121; No. 119 1/2, \$121.50; No. 120, \$122; No. 120 1/2, \$122.50; No. 121, \$123; No. 121 1/2, \$123.50; No. 122, \$124; No. 122 1/2, \$124.50; No. 123, \$125; No. 123 1/2, \$125.50; No. 124, \$126; No. 124 1/2, \$126.50; No. 125, \$127; No. 125 1/2, \$127.50; No. 126, \$128; No. 126 1/2, \$128.50; No. 127, \$129; No. 127 1/2, \$129.50; No. 128, \$130; No. 128 1/2, \$130.50; No. 129, \$131; No. 129 1/2, \$131.50; No. 130, \$132; No. 130 1/2, \$132.50; No. 131, \$133; No. 131 1/2, \$133.50; No. 132, \$134; No. 132 1/2, \$134.50; No. 133, \$135; No. 133 1/2, \$135.50; No. 134, \$136; No. 134 1/2, \$136.50; No. 135, \$137; No. 135 1/2, \$137.50; No. 136, \$138; No. 136 1/2, \$138.50; No. 137, \$139; No. 137 1/2, \$139.50; No. 138, \$140; No. 138 1/2, \$140.50; No. 139, \$141; No. 139 1/2, \$141.50; No. 140, \$142; No. 140 1/2, \$142.50; No. 141, \$143; No. 141 1/2, \$143.50; No. 142, \$144; No. 142 1/2, \$144.50; No. 143, \$145; No. 143 1/2, \$145.50; No. 144, \$146; No. 144 1/2, \$146.50; No. 145, \$147; No. 145 1/2, \$147.50; No. 146, \$148; No. 146 1/2, \$148.50; No. 147, \$149; No. 147 1/2, \$149.50; No. 148, \$150; No. 148 1/2, \$150.50; No. 149, \$151; No. 149 1/2, \$151.50; No. 150, \$152; No. 150 1/2, \$152.50; No. 151, \$153; No. 151 1/2, \$153.50; No. 152, \$154; No. 152 1/2, \$154.50; No. 153, \$155; No. 153 1/2, \$155.50; No. 154, \$156; No. 154 1/2, \$156.50; No. 155, \$157; No. 155 1/2, \$157.50; No. 156, \$158; No. 156 1/2, \$158.50; No. 157, \$159; No. 157 1/2, \$159.50; No. 158, \$160; No. 158 1/2, \$160.50; No. 159, \$161; No. 159 1/2, \$161.50; No. 160, \$162; No. 160 1/2, \$162.50; No. 161, \$163; No. 161 1/2, \$163.50; No. 162, \$164; No. 162 1/2, \$164.50; No. 163, \$165; No. 163 1/2, \$165.50; No. 164, \$166; No. 164 1/2, \$166.50; No. 165, \$167; No. 165 1/2, \$167.50; No. 166, \$168; No. 166 1/2, \$168.50; No. 167, \$169; No. 167 1/2, \$169.50; No. 168, \$170; No. 168 1/2, \$170.50; No. 169, \$171; No. 169 1/2, \$171.50; No. 170, \$172; No. 170 1/2, \$172.50; No. 171, \$173; No. 171 1/2, \$173.50; No. 172, \$174; No. 172 1/2, \$174.50; No. 173, \$175; No. 173 1/2, \$175.50; No. 174, \$176; No. 174 1/2, \$176.50; No. 175, \$177; No. 175 1/2, \$177.50; No. 176, \$178; No. 176 1/2, \$178.50; No. 177, \$179; No. 177 1/2, \$179.50; No. 178, \$180; No. 178 1/2, \$180.50; No. 179, \$181; No. 179 1/2, \$181.50; No. 180, \$182; No. 180 1/2, \$182.50; No. 181, \$183; No. 181 1/2, \$183.50; No. 182, \$184; No. 182 1/2, \$184.50; No. 183, \$185; No. 183 1/2, \$185.50; No. 184, \$186; No. 184 1/2, \$186.50; No. 185, \$187; No. 185 1/2, \$187.50; No. 186, \$188; No. 186 1/2, \$188.50; No. 187, \$189; No. 187 1/2, \$189.50; No. 188, \$190; No. 188 1/2, \$190.50; No. 189, \$191; No. 189 1/2, \$191.50; No. 190, \$192; No. 190 1/2, \$192.50; No. 191, \$193; No. 191 1/2, \$193.50; No. 192, \$194; No. 192 1/2, \$194.50; No. 193, \$195; No. 193 1/2, \$195.50; No. 194, \$196; No. 194 1/2, \$196.50; No. 195, \$197; No. 195 1/2, \$197.50; No. 196, \$198; No. 196 1/2, \$198.50; No. 197, \$199; No. 197 1/2, \$199.50; No. 198, \$200; No. 198 1/2, \$200.50; No. 199, \$201; No. 199 1/2, \$201.50; No. 200, \$202; No. 200 1/2, \$202.50; No. 201, \$203; No. 201 1/2, \$203.50; No. 202, \$204; No. 202 1/2, \$204.50; No. 203, \$205; No. 203 1/2, \$205.50; No. 204, \$206; No. 204 1/2, \$206.50; No. 205, \$207; No. 205 1/2, \$207.50; No. 206, \$208; No. 206 1/2, \$208.50; No. 207, \$209; No. 207 1/2, \$209.50; No. 208, \$210; No. 208 1/2, \$210.50; No. 209, \$211; No. 209 1/2, \$211.50; No. 210, \$212; No. 210 1/2, \$212.50; No. 211, \$213; No. 211 1/2, \$213.50; No. 212, \$214; No. 212 1/2, \$214.50; No. 213, \$215; No. 213 1/2, \$215.50; No. 214, \$216; No. 214 1/2, \$216.50; No. 215, \$217; No. 215 1/2, \$217.50; No. 216, \$218; No. 216 1/2, \$218.50; No. 217, \$219; No. 217 1/2, \$219.50; No. 218, \$220; No. 218 1/2, \$220.50; No. 219, \$221; No. 219 1/2, \$221.50; No. 220, \$222; No. 220 1/2, \$222.50; No. 221, \$223; No. 221 1/2, \$223.50; No. 222, \$224; No. 222 1/2, \$224.50; No. 223, \$225; No. 223 1/2, \$225.50; No. 224, \$226; No. 224 1/2, \$226.50; No. 225, \$227; No. 225 1/2, \$227.50; No. 226, \$228; No. 226 1/2, \$228.50; No. 227, \$229; No. 227 1/2, \$229.50; No. 228, \$230; No. 228 1/2, \$230.50; No. 229, \$231; No. 229 1/2, \$231.50; No. 230, \$232; No. 230 1/2, \$232.50; No. 231, \$233; No. 231 1/2, \$233.50; No. 232, \$234; No. 232 1/2, \$234.50; No. 233, \$235; No. 233 1/2, \$235.50; No. 234, \$236; No. 234 1/2, \$236.50; No. 235, \$237; No. 235 1/2, \$237.50; No. 236, \$238; No. 236 1/2, \$238.50; No. 237, \$239; No. 237 1/2, \$239.50; No. 238, \$240; No. 238 1/2, \$240.50; No. 239, \$241; No. 239 1/2, \$241.50; No. 240, \$242; No. 240 1/2, \$242.50; No. 241, \$243; No. 241 1/2, \$243.50; No. 242, \$244; No. 242 1/2, \$244.50; No. 243, \$245; No. 243 1/2, \$245.50; No. 244, \$246; No. 244 1/2, \$246.50; No. 245, \$247; No. 245 1/2, \$247.50; No. 246, \$248; No. 246 1/2, \$248.50; No. 247, \$249; No. 247 1/2, \$249.50; No. 248, \$250; No. 248 1/2, \$250.50; No. 249, \$251; No. 249 1/2, \$251.50; No. 250, \$252; No. 250 1/2, \$252.50; No. 251, \$253; No. 251 1/2, \$253.50; No. 252, \$254; No. 252 1/2, \$254.50; No. 253, \$255; No. 253 1/2, \$255.50; No. 254, \$256; No. 254 1/2, \$256.50; No. 255, \$257; No. 255 1/2, \$257.50; No. 256, \$258; No. 256 1/2, \$258.50; No. 257, \$259; No. 257 1/2, \$259.50; No. 258, \$260; No. 258 1/2, \$260.50; No. 259, \$261; No. 259 1/2, \$261.50; No. 260, \$262; No. 260 1/2, \$262.50; No. 261, \$263; No. 261 1/2, \$263.50; No. 262, \$264; No. 262 1/2, \$264.50; No. 263, \$265; No. 263 1/2, \$265.50; No. 264, \$266; No. 264 1/2, \$266.50; No. 265, \$267; No. 265 1/2, \$267.50; No. 266, \$268; No. 266 1/2, \$268.50; No. 267, \$269; No. 267 1/2, \$269.50; No. 268, \$270; No. 268 1/2, \$270.50; No. 269, \$271; No. 269 1/2, \$271.50; No. 270, \$272; No. 270 1/2, \$272.50; No. 271, \$27

Patent Cable Laid Italian " "	.....	7	22	23	156
India Cable Laid " "	.....	7	22	23	156
Silver Lake, A Quality, White	.....	504	dis	10410425	35
Silver Lake, A Quality, Drab	.....	554	dis	10410425	35
Silver Lake, B Quality, White	.....	504	dis	10410425	35
Silver Lake, B Quality, Drab	.....	554	dis	10410425	35
Silver Lake, C Quality, White (only)	.....	374	dis	10410425	35
Silver Lake, C Quality, Drab	.....	374	dis	10410425	35
Sylvan Spring, Extra Braided, Drab	.....	349	dis	10410425	35
Semper Idem, Braided, White	.....	349	dis	10410425	35
Samson, India Hemp, Braided	.....	349	dis	10410425	35
Samson, Braided, White Cotton	.....	504	dis	30	30425
Samson, Braided, Drab Cotton	.....	554	dis	30	30425
Samson, Braided Italian Hemp	.....	554	dis	30	30425
Samson Braided Linen	.....	504	dis	30	30425
Shack Locks.					
Clark's No. 1, \$10.00; No. 2, \$2.00	per gross	.....	dis	25425	
Hargensen's	.....	dis	25425		
Mason and Triumph, list Aug. 16, 1886	.....	dis	50425		
Victor	.....	dis	10410425		
Walker	.....	dis	10		
Atwell Mfg. Co.	.....	dis	25		
Reading	dis 60425	10	dis 60425	10410	
Hammond's Window Springs	.....	dis	10		
Common Sense, Nap & Co's and B's	per gross	.....	dis	40	
Common Sense, Nickel Plated	.....	per gross	dis	10	
Universal	.....	dis	30		
Kempshall's Gravity	.....	dis	60		
Kempshall's Model	.....	dis	60	10410	
Corbin's Daisy, list February 15, 1886	.....	dis	70		
Payson's Perfect	.....	dis	60	10410	
Improved Improved Adjustable	.....	dis	25425		
....., list Jan. 5, 1897	.....	dis	25425		
Huginin's New Shack Locks, list Jan. 4, '87	dis	25425			
Stoddard "Practical"	.....	dis	10		
Ives Patent	.....	dis	60		
Leesche's Nos. 100 & 110	per gross	.....	dis	20410	
....., list Apr. 1, Barnes Mfg. Co.	.....	dis	50		
Champion Safety, list March 1, 1888	.....	dis	55	10425	
Shack Weights.					
Solid Eyes	.....	per ton	.....	.....	.....
Sausage Stuffers or Fillers.					
Miles' "Challenge"	.....	per doz.	dis	50425	
Perry	.....	per doz.	dis	50425	
Draw Cut No. 4	.....	each	dis	30	
Enterprise Mfg. Co.	.....	dis	20410	25	
Wheeler	.....	dis	40410		
Saws.					
Dixton's Circular	.....	dis	45	45425	
Dixton's Cross Cuts, dis 45	45425	.....	.....	.....	.....
Atkins' Hand	.....	dis	25	25425	
Atkins' Circular	.....	dis	50		
Atkins' Silver Steel Diamond X Cuts	.....	per foot	704		
Atkins' Special Steel Dexter X Cuts	.....	per foot	704		
Atkins' Special Steel Diamond X Cuts	.....	per foot	304		
Atkins' Champion and Electric Tooth X Cuts	.....	per foot	27		
Atkins' Hollow Back X Cuts	.....	per foot	154		
Atkins' Hingling, Mulay, Drag, &c.	.....	dis	45		
W. M. & C. Hand	.....	dis	50425	30410	
W. M. & C. Champion X Cuts, Regular	per foot	34	60410		
W. M. & C. X Cuts, Thin Back	.....	per foot	27	25425	
Peace Circular and Mill	.....	dis	45	10410	
Peace Hand Panel and Rip	.....	dis	50410	30410410	
Peace Cross Cuts, Standard	.....	per foot	25		
Peace Cross Cuts, Thin Back	.....	dis	27	25425	
Richardson's Circular and Mill	.....	dis	45	10410	
Richardson's X-Cuts, No. 1, 25¢; No. 2, 37¢; No. 3, 24¢	.....	.....	.....	.....	.....
Hack Saws.					
Griffin's Hack Saws, complete	.....	dis	40410	50	
Griffin's Hack Saw Blades only	.....	dis	40410	50	
Star, Hack Saws and Blades	.....	dis	25		
Diamond Hack Saws and Blades	.....	dis	25		
Eureka and Crescent	.....	dis	25		
Saw Frames.					
White Vermont	.....	per gross	dis	50	10410
Red, Polished, and Varnished	.....	per doz.	dis	15	50
Saw Sets.					
Stillman's Genuine	.....	per doz.	dis	50.00 and 57.75	dis 40425
Stillman's Imita.	per doz.	dis	50.00 and 57.75	dis 40425	50
Common Lever	.....	per doz.	dis	50.00	dis 40425
Stillman's No. 1, \$15.00; No. 2, \$4.25	per doz.	dis	50.00	dis 40425	50
Leach's	per doz.	dis	50.00; No. 1, \$15.00	dis 15	50
Nash's	.....	dis	50410	50410410	10
Hammer, Hotchkiss	.....	dis	50	dis 10	
Hammer, Bemis & Call Co.'s new Patent	.....	dis	50425		
Bemis & Call Co.'s Lever and Spring Hammer	dis	50425			
Bemis & Call Co.'s Plate	.....	dis	10410		
Bemis & Call Co.'s Cross Cut	.....	dis	10410		
Alken's Genuine	.....	dis	50.00	dis 50410	
Alken's Imitation	.....	dis	57.00	dis 50425	
Hart's Patent Lever	.....	dis	50		
Dixton's, Star, 70, No. 15, 25.50	dis	50410	50410410	10	
Atkins' Lever	.....	per doz	dis	50.00	No. 1, 50.00
Atkins' Criterion	.....	per doz	dis	50.00	No. 1, 50.00
Croissant (Keller), No. 1, \$15.00; No. 2, \$24.00	dis	25425	10		
Saw Teels.					
Atkins Perfection	.....	\$15.00; Excelsior	50.00	per doz	
Scales.					
Hatch, Counter, No. 171, good quality	.....	per doz	dis	50	10410
Hatch, Tea, No. 181	.....	per doz	dis	50.75	57.00
Union Platform, Plain	.....	dis	22	10	40
Union Platform, Striped	.....	dis	22	30	40
Chattillon's Grocers' Trip Scales	.....	dis	50		
Chattillon's No. 1	.....	dis	50		
Chattillon's Favorite	.....	dis	40		
Family, Turnbills	.....	dis	30	50410	
Scale Beams.					
Scale Beams, list of Jan. 13, 88	dis	50410	50410425		
Chattillon's No. 1	.....	dis	40		
Chattillon's No. 2	.....	dis	50		
Scrapers.					
Adjustable Box Scraper (B. R. & L. Co.)	dis	150.50	dis	30410	10
Box, 1 Handle	.....	per doz.	dis	84.00	dis 10
Box, 2 Handle	.....	per doz.	dis	84.00	dis 10
Defiance Box and Ship	.....	dis	50		
Ship, Common	.....	dis	50	50	10410
Ship, Providence Tool Co.	.....	dis	50		
Screen Window and Door Frames.					
Porter's Pat. Window and Door Frame	.....	dis	35	40	10
Screen Corner Irons, Warner's	.....	dis	35	40	10
Stearns' Frames and Corners	.....	dis	25	40	10
Screw Drivers.					
Douglas Mfg Co.	.....	dis	50410410		
Dixton's	.....	dis	45	10410	
Dixton's Patent Excelsior	.....	dis	45	10410	
Buck Bros	.....	dis	50		
Stanley & L. Co.'s Varnished Handles	.....	dis	50	10410	
Stanley & L. Co.'s Black Handles	.....	dis	50	10410	
Sargent & Co.'s No. 1 Forged Blade	dis	704	10410		
Sargent & Co.'s No. 20	.....	dis	60425	10410	
Sargent & Co.'s Nos. 40 & 50, Cast Steel	.....	dis	60410		
Sargent & Co.'s No. 60, Round Blade	.....	dis	70410		
Knapp & Cowles' No. 1	.....	dis	60	20	70
Knapp & Cowles' No. 2	.....	dis	60	20	70
Knapp & Cowles' No. 30 & 40	.....	dis	50425	50410425	
Stearns	.....	dis	50410		
Gay & Parsons	.....	dis	25		
Champion	.....	dis	25		
Clark's	.....	dis	25		
Croissant's Adjustable	.....	dis	50		
Elmrich's Socks and Ratchets	dis	25	50410	
Allard's Spiral, new list	dis	25		
Kelb's Common Sense	per doz	dis	50	dis 10

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CURRENT METAL PRICES.

AUGUST 8, 1888.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market reports.

IRON AND STEEL.

Bar Iron from Store.

Common Iron:	
1 to 2 in. round and square.	1/2 lb 1.90 @ 2.00
1 to 6 in. x 1/2 to 1 in.	
Refined Iron:	
1/2 to 2 in. round and square.	1/2 lb 2.10 @ 2.25
1 to 4 in. x 1/2 to 1 1/2 in.	
4 1/2 to 6 in. x 1/2 to 1 in.	
1 to 6 in. x 1/2 and 5-16	1/2 lb 2.30 @ 2.45
Rods—1/2 and 11-16 round and sq.	1/2 lb 2.20 @ 2.35
Bands—1 to 6 x 1-16 to No. 12.	1/2 lb 2.30 @ 2.45
"Burden Best" Iron, base price.	1/2 lb 3.00 @
Burden's "H. B. & S." Iron, base price.	1/2 lb 2.80 @
"Ulster"	1/2 lb 3.10 @
Norway Rods	4.00 @ 5.00

Merchant Steel from Store.

Open-Hearth and Bessemer Machinery.	
Toe Calk, Tire and Sleigh Shoe, base price in small lots.	2 1/2 @ 3
Best Cast Steel, base price in small lots	3 1/2 @ 4
Best Cast Steel Machinery, base price in small lots.	5 1/2 @ 6
For Classification and Extras adopted by the Merchant Steel Association of the United States, June 1, 1888, see The Iron Age, June 21, 1888.	

Sheet Iron from Store.

Common American.	R. G. Cleaned.
10 to 16.	1/2 lb 2.75 @ 2.80
17 to 20.	1/2 lb 2.85 @ 3.00
21 to 24.	1/2 lb 3.00 @ 3.10
25 and 26.	1/2 lb 3.20 @ 3.30
27.	1/2 lb 3.35 @ 3.75
28.	1/2 lb 3.50 @ 4.00
B. R.	2d qual.
Galv'd, 14 to 20.	1/2 lb 4.50 @ 4.80
Galv'd, 1 to 24.	1/2 lb 4.87 1/2 @ 4.75
Galv'd, 25 to 28.	1/2 lb 5.25 @ 5.12
Galv'd, 27.	1/2 lb 5.62 1/2 @ 5.48
Galv'd, 28.	1/2 lb 6.00 @ 5.85
Patent Platinized.	1/2 lb A 10 @ B 6
Russia.	1/2 lb B 2 1/2 @ 10
American Cold Rolled B. B.	1/2 lb B 4 @ 7

English Steel from Store.

Best Cast.	1/2 lb 15 @
Extra Cast.	1/2 lb 16 1/2 @ 17
Swaged Cast.	1/2 lb 16 @
Best Double Shear.	1/2 lb 15 @
Elster, 1st quality.	1/2 lb 12 1/2 @
German Steel, Best.	1/2 lb 10 @
2d quality.	1/2 lb 9 @
3d quality.	1/2 lb 8 @
Sheet Cast Steel, 1st quality.	1/2 lb 15 @
2d quality.	1/2 lb 14 @
3d quality.	1/2 lb 13 1/2 @

METALS.

Banco, Pigs.	24 @
Straits, Pigs.	24 @
English, Pigs.	24 @
Straits in Bars.	24 @ 25

Tin Plates.

Charcoal Plates—Bright.	Per box.
Melny Grade.	
IC, 10 x 14.	\$5.75 @ \$6.00
IC, 12 x 12.	6.00 @ 6.25
IC, 14 x 10.	5.75 @ 6.00
IC, 20 x 28.	12.25 @ 12.50
IX, 10 x 14.	7.25 @ 7.50
IX, 12 x 12.	7.50 @ 7.75
IX, 14 x 10.	7.25 @ 7.50
IX, 20 x 28.	15.25 @ 15.50
DC, 12 1/2 x 17.	5.50 @ 5.75
DX, 12 1/2 x 17.	7.00 @ 7.25
Calland Grade.	
IC, 10 x 14.	\$6.00 @
IC, 12 x 12.	6.25 @
IC, 14 x 10.	6.00 @
IX, 10 x 14.	7.50 @
IX, 12 x 12.	7.75 @
IX, 14 x 10.	7.50 @
Allaway Grade.	
IC, 10 x 14.	\$5.25 @
IC, 12 x 12.	5.50 @
IC, 14 x 10.	5.25 @
IX, 10 x 14.	10.75 @
IX, 12 x 12.	6.25 @
IX, 14 x 10.	6.25 @
IX, 20 x 28.	12.50 @
DC, 12 1/2 x 17.	5.00 @
DX, 12 1/2 x 17.	6.00 @

Coke Plates—Bright.

Steel Coke.—IC, 10 x 14, 14 x 20.	\$4.80 @
10 x 20.	7.50 @
20 x 28.	10.00 @
IX, 10 x 14, 14 x 20.	5.65 @
BV Grade.—IC, 10 x 14, 14 x 20.	4.70 @
Charcoal Plates—Tenne.	
Dean Grade.—IC, 14 x 20.	\$4.62 1/2 @
20 x 28.	9.25 @
IX, 14 x 20.	5.62 1/2 @
20 x 28.	11.37 1/2 @
Abecarne Grade.—IC, 14 x 20.	4.50 @
20 x 28.	9.00 @
IX, 14 x 20.	5.50 @
20 x 28.	10.80 @

Tin Boiler Plates.

IXX, 14 x 26.	112 sheets @ \$12.50 @ \$12.75
IXX, 14 x 28.	112 sheets @ 12.75 @
IXX, 14 x 31.	112 sheets @ 14.25 @

Copper.

Duty: Pig. Bar and Ingot. 4¢; Old Copper, 3¢ 1/2 lb.	
Manufactured (including all articles of which Copper is a component of chief value), 4 1/2 ¢ ad valorem.	
Ingot.	
Lake.	@ 17.50
"Anchor" Brand.	@ 17

Prices adopted by the Association of Copper Manufacturers of the United States, December 10, 1887, being quotations for all sized lots.

Not wider than	Not longer than	And longer than	Over 64 oz.	32 oz.	16 oz.	8 oz.	4 oz.	2 oz.	1 oz.	Less than 1/2 oz.
30—72	25	25	25	25	25	25	25	25	25	25
30—72	25	25	25	25	25	25	25	25	25	25
36—96	25	25	25	25	25	25	25	25	25	25
36—96	25	25	25	25	25	25	25	25	25	25
48—96	25	25	25	25	25	25	25	25	25	25
48—96	25	25	25	25	25	25	25	25	25	25
60—96	25	25	25	25	25	25	25	25	25	25
60—96	25	25	25	25	25	25	25	25	25	25
84—96	25	25	25	25	25	25	25	25	25	25
84—96	25	25	25	25	25	25	25	25	25	25
Over 84 in. wide	25	25	25	25	25	25	25	25	25	25

All Bath Tub Sheets.	16 oz.	14 oz.	12 oz.	10 oz.
Per pound.	\$0.28	0.30	0.32	0.35
Bolt Copper, 1/2 inch diameter and over, per pound.	25			
Circles, 60 inches in diameter and less, 3 cents per pound advance over lowest prices of Sheet Copper of the same thickness.				
Circles, over 60 inches diameter, up to 96 inches diameter, inclusive, 5 cents per pound advance over lowest prices of Sheet Copper of the same thickness.				
Circles, over 96 inches diameter, 6 cents per pound advance over lowest prices of Sheet Copper of the same thickness.				
Segment and Pattern Sheets, 3 cents per pound advance over price of sheets required to cut them from.				
Cold or Hard Rolled Copper, 14 ounces per square foot and heavier, 1 cent per pound over the foregoing prices.				
Cold or Hard Rolled Copper, lighter than 14 ounces per square foot, 2 cents per pound over the foregoing prices.				

Copper Bottoms, Pits and Flats.

14 ounce to square foot and heavier.	28
12 ounce and up to 14 ounce to square foot.	28
10 ounce and up to 12 ounce.	31
Circles less than 8 inches diameter 2 cents per pound additional.	
Circles over 18 inches diameter are not classed as Copper Bottoms.	

Tinning.

Tinning sheets on one side, 10, 12 and 14 x 48 each.	8
Tinning sheets on one side, 30 x 60 each.	30
For tinning boiler sizes, 9 in. (sheets 14 in. x 60 in.), each.	15
For tinning boiler sizes, 8 in. (sheets 14 in. x 56 in.), each.	13
For tinning boiler sizes, 7 in. (sheets 14 in. x 52 in.), each.	12
Tinning sheets on one side, other sizes, per square foot.	2 1/2
For tinning both sides double the above prices.	

Planished Copper.

Planished Copper List May 5, 1888.	Net
Seamless Copper.	
1/2 inch 1/2 lb.	50
3/4 " " "	44
1 " " "	42
1 1/4 " " "	40
1 3/4 " " "	38
2 " " "	37
2 1/2 " " "	34
3 " " "	31
Seamless Brass.	
1/2 inch 1/2 lb.	47
3/4 " " "	41
1 " " "	39
1 1/4 " " "	37
1 3/4 " " "	36
2 " " "	34
2 1/2 " " "	31

Roll and Sheet Brass.

Discount from list.	10 @ 15
Duty: Pig. Bars and Plates, \$1.50 1/2 100 lb.	
Western Spelter.	5 1/2
" Bergenport "	5 1/2
" Bertha "	7 1/2 @ 8

Zinc.

Duty: Sheet, 2 1/2 1/2 lb.	
600 lb casks.	5 1/2
Per lb.	7

Lead.

Duty: Pig. 32 1/2 100 lb. Old Lead, 2 1/2 1/2 lb. Pipe and Sheets, 3 1/2 1/2 lb.	
American.	4 1/2 @ 5
Newark.	4 1/2 @ 5
Bar, subject to trade discount.	5 1/2
Pipe, subject to trade discount.	6 1/2
Tin-Lined Pipe, subject to trade discount.	15
Block Tin Pipes, subject to trade discount.	40
Sheet, subject to trade discount.	7 1/2

Solder.

1/2 @ 1/4 (Guaranteed).	15
Extra Wiping.	18
The prices of the many other qualities of Solder in the market indicated by private brands vary according to composition.	

Antimony.

Cookson.	1/2 lb 18 1/2 @ 14
Manufactured.	11 1/2

Plumbers' Brass Work.

Ground Bibbs and Stops.	Discount per cent.
Ground Stops, Hydrant Cocks, &c.	55 @ 10 1/2
Corporation Cocks.	55 @ 10 1/2

Corporation Cocks, "Mueller" Pattern, from Western list.	55 @ 10 1/2
Ground Basin and Shampooing Cocks.	50 @ 10 1/2
Compression Basin Cocks.	50 @ 10 1/2
Compression Basin and Sink Cocks.	50 @ 10 1/2
Compression Pantry Cocks.	50 @ 10 1/2
Compression Double Basin and Shampooing Cocks.	50 @ 10 1/2
Compression Double Bath Cocks.	50 @ 10 1/2
Compression Bibbs, Urinal Cocks, Still Cocks, Stops, Hopper Cocks, Hydrant Cocks and Ball Cocks.	50 @ 10 1/2
Basin Plugs and Basin Grates.	55 @ 10 1/2
Bath and Wash Tray Plugs.	55 @ 10 1/2
Bath Wastes and Washers, Bath and Basin Valves, Sewer and Vacuum Valves, Cistern Valves, Pump Valves and Strainers, Ship Cocks, Valves and Suction Baskets.	55 @ 10 1/2
Basin Clamps, Basin Joints and Strainers.	55 @ 10 1/2
Boiler Couplings, Ground Face, per set \$1.25.	dis 10
Boiler Couplings, Plain Face, per set \$1.20.	dis 10
Water Back Valve and Plain Couplings, Solder, Ing Nipples and Unions.	55 @ 10 1/2
Union Joints.	60 @ 10 1/2
Hydrant Nozzles, Handles and Guides, Sockets and Clamps, Street Washer Screws and Guides.	55 @ 10 1/2
Hose Goods.	55 @ 10 1/2

Steam and Gas Fitters' Brass and Iron Work.

Discount per cent.	
Brass Globe Valves.	60 @ 10 1/2
Finished Brass Globe Valves, with Finished Brass Wheels.	40 @ 10 1/2
Brass Globe Valves, with Patent Wood Wheels.	60 @ 10 1/2
Brass Globe Angle and Corner Valves.	60 @ 10 1/2
Brass Radiator Angle Valves.	60 @ 10 1/2
Brass Radiator Angle Valves, Frink's Patent.	60 @ 10 1/2
Brass Cross and Check Valves.	60 @ 10 1/2
Brass Check Valves.	60 @ 10 1/2
Brass Hose Valves.	60 @ 10 1/2
Brass and Iron Frink Valves.	60 @ 10 1/2
Brass Safety Valves.	60 @ 10 1/2
Brass Vacuum Valves.	50 @ 10 1/2
Brass Whistle Valves.	60 @ 10 1/2
Brass Balance, Back Pressure and Foot Valves.	50 @ 10 1/2
Brass Butterfly and Throttle Valves.	50 @ 10 1/2
Brass Pump Valves.	50 @ 10 1/2
Brass Steam Cocks.	57 1/2 @ 10 1/2
Brass Service, Meter and Union Tees.	57 1/2 @ 10 1/2
Brass Whistles, Water Gauges and Oil Cups.	60 @ 10 1/2
Brass Hollow Plug, Tallow and Globe Oil Cups.	60 @ 10 1/2
Brass Lubricators.	60 @ 10 1/2
Brass Air Valves.	60 @ 10 1/2
Brass Air Cocks.	60 @ 10 1/2
Brass Gauge Cocks.	55 @ 10 1/2
Brass Cylinder Cocks and Steam Bibbs.	50 @ 10 1/2
Brass Swing Joints and Expansion Joints.	50 @ 10 1/2
Brass Test Pumps.	50 @ 10 1/2
Brass Steam Fittings, Rough.	60 @ 10 1/2
Brass Steam Fittings, Finished.	60 @ 10 1/2
Brass Union Joints.	60 @ 10 1/2
Brass Soldering Unions and Nipples.	55 @ 10 1/2
Brass Hose Fittings, Fusible and Boiler Plugs.	55 @ 10 1/2
Iron Body Globe, Angle, Cross and Check Valves.	60 @ 10 1/2
Iron Body Safety, Throttle, Back Pressure, Butterfly and Foot Valves.	60 @ 10 1/2
Iron Cocks, all Iron Valves.	60 @ 10 1/2
All Iron Valves.	60 @ 10 1/2

Miscellaneous.

Discount per cent.	
Cast Iron Fittings.	70 @ 10
Flugs and Bushings.	75 @ 10
Malleable Iron Unions.	67 1/2
Malleable Iron Fittings.	65

Paints.

Black, Lamp—Coach Painters'.	1/2 lb 22 @ 24
" Ordinary.	6
Black, Ivory Drop, fair.	12 @ 15
" best.	24
Black Paint, in oil, kegs, 8¢; assorted cans, 11¢.	
Blue, Prussian, fair to best.	40 @ 55
" " in oil.	45 @ 55
" Chinese dry.	70
" Ultramarine.	15 @ 30
Brown, Spanish.	14 @ 15
" Van Dyke.	10 @ 12 1/2
Dryers, Patent American, ass'd cans, 9¢; kegs, 7¢.	
Green, Chrome.	15 @ 20
Green, Chrome in oil.	14 @ 18
Green, Paris.	good, 30¢; best, 35¢
Green, Paris in oil.	good, 30¢; best, 35¢
Iron Paint, Bright Red.	1/2 lb 24 @
Iron Paint, Brown.	1/2 lb 11 @
Iron Paint, Purple.	1/2 lb 3 @
Iron Paint, Ground in oil, Bright Red.	1/2 lb 6 @
Iron Paint, Ground in oil, Red.	1/2 lb 5 @
Iron Paint, Ground in oil, Brown.	1/2 lb 5 @
Iron Paint, Ground, Purple.	1/2 lb 6 @
Litharge.	11 @
Mineral Paints.	2 @ 4
Orange Mineral.	2 @ 10
Red Lead, American.	6 @
Red Venetian (Eng.) dry.	\$1.65 @ \$1.70
Red Venetian in oil.	ass't'd cans, 11¢; kegs, 8¢
Red Indian Dry.	9 @ 12
Rose Pink.	10 @

THE IRON AGE

THURSDAY, AUGUST 16, 1888.

The Beck Automatic Engine.

One of the later results in the line of automatic engine building is the Beck engine, turned out by the Taylor Mfg. Company, of Chambersburg, Pa., according to the diagrams of Mr. Robert M. Beck, su-

line, thereby overcoming the objection that is sometimes raised against the single disk or side-crank engine.

Fig. 1 represents a perspective view of the engine from the crankshaft end, showing the oil-guard surrounding the crank-disk and governor, as well as a part of the

outer edges. The forward steam port exhausts directly out of the cylinder, and the back port through the inside of the valve. An attachment of especial value is the automatic relief valve rigging, which is shown attached to the under side of the valve chamber (see Fig. 5), consisting of a

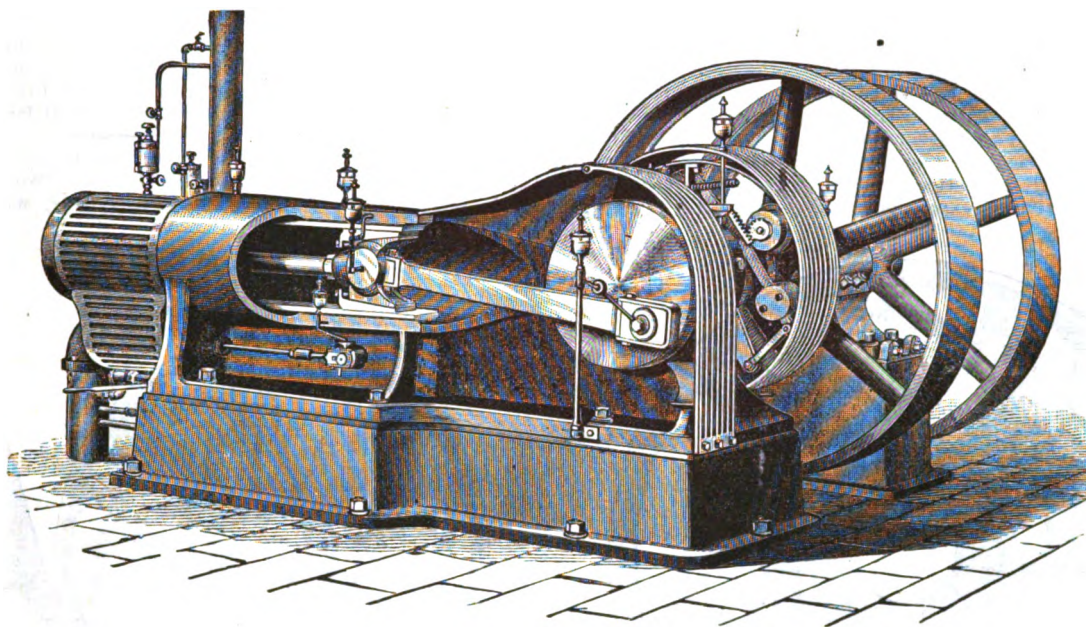


Fig. 1.—General View.

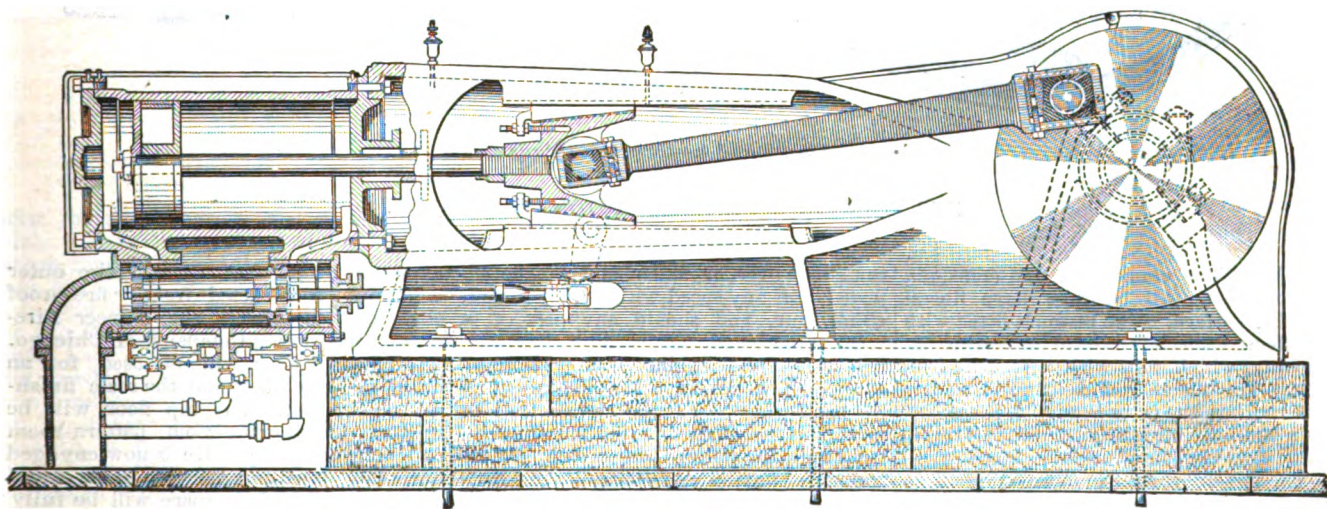


Fig. 2.—Longitudinal Section.

NEW HIGH SPEED AUTOMATIC ENGINE, BUILT BY THE TAYLOR MFG. CO., CHAMBERSBURG, PA.

perintendent of the works. The engine embraces a number of new features, and is the outgrowth of a careful study of what is required for an automatic engine to properly meet the requirements of modern electric lighting.

The engravings which we give on this page, as well as on the two pages following, will help to a better understanding of the nature of the design. The engine is secured to a very heavy cast-iron bed, which is anchored to a foundation, and forms a substitute for cap-stone and brick. This base makes the engine self-contained and renders it impossible to get out of

latter in position on the shaft. It shows, also, the position of the oil-cups on the main bearings, eccentric and crank-pin. All the cups are large, so as to avoid frequent filling, and have a very simple arrangement for setting at any feed desired.

Fig. 2 is a sectional side elevation, showing the full interior and the manner of connecting, from which a very clear idea of the valve arrangement can be obtained. Live steam entirely surrounds the valve, which is perfectly balanced, and the admission to the cylinder is accomplished by the inside edges of the valve head, or rings, the exhaust being controlled by the

valve connected to each steam port, with a cam, B, and a lever, C, between them, to which the valve stems I are connected in such manner that one movement of the lever opens and closes the valve. A spiral spring ingeniously arranged on the valve stems automatically relieves any sudden accumulation of condensation from priming of boilers, or other causes. The valves are also provided with a thin cap, H, that will break and relieve the cylinder of condensation should the valves fail to afford sufficient relief, thus doubly insuring against accident from accumulation of water in the cylinder. The valves are pro-

vided with a butterfly stop, J, that can be closed when the cap breaks, allowing another one to be put in its place without the serious disadvantage of having to stop the engine. There is also a relief valve attached to the hollow stud G which carries the cam and lever B and C, communicating with the live steam section of the valve chamber to carry off condensation from the steam pipe and chamber before admitting steam to the cylinder. All the waste is conveyed into the main exhaust pipe.

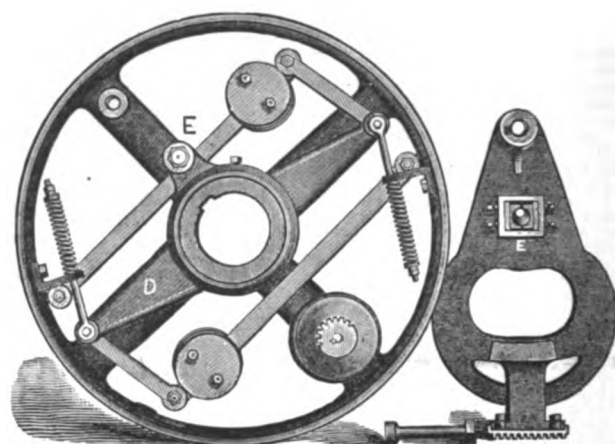
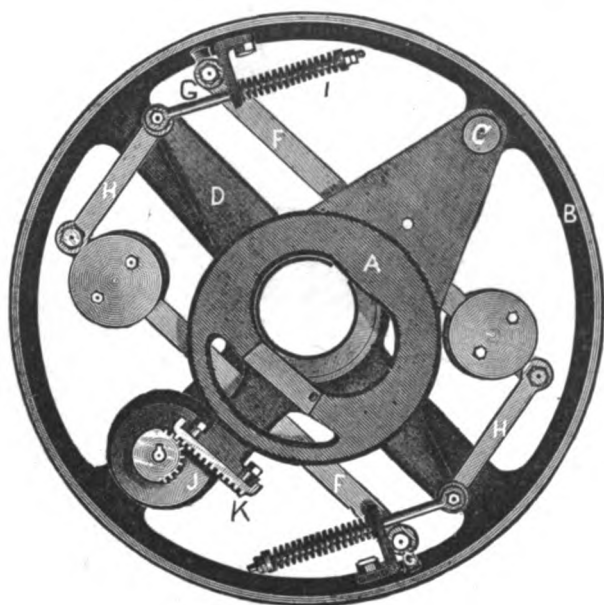
The engine bed is of the trunk-girder type, very heavy and rigid. The steam passages are large and direct. The valve is of the hollow piston class, and works in bushings secured to the valve chamber in such a manner as to be easily removed in case of wear. New ones can thus be readily inserted. The valve rings are independent of the valve barrel, being ground on to it and held by a follower, the same as packing rings on a locomotive piston. There is thus perfect freedom of action, irrespective of expansion or over-

which movement is not sensibly resisted by the oil, except in case of sudden action; consequently all jumping of weights and racing of engine are prevented, making a very important feature where close regulation is required, as in electric-light plants. So perfect is the control over the steam and sudden changes of load claimed to be that the throttle-valve can be instantly thrown wide open, admitting full head of steam in starting the engine, and the motion of the engine will increase to full speed as evenly and smoothly as if regulated by a gradual opening of the throttle. The eccentric is connected directly to the valve, so that its action is instantaneous, admitting steam to piston at full boiler pressure, varying the point of cut-off as resistance requires from its beginning to three-fourths stroke. The heavier the load the less the lead and compression, and when the engine is running without a load the lead and compression is so arranged that smooth and easy action of engine is assured. The governor is reversible, to

springs, reducing the throw eccentric, and causing a corresponding reduction in the admission of steam, thereby preventing an increase of speed. The prompt action of the regulator in controlling the speed proves a very important factor where the engines and dynamos are being run in pairs and it becomes necessary to shift the load. In changing the load from one engine to another the speed of the engine remains constant, thus obviating the difficulty following the load.

The engine is built in sizes varying from 20 to 227 horse-power, the cylinder dimensions varying from 7 x 8 to 18½ x 24 inches. Where it is desired only one band-wheel is used, the face being made to receive a belt in proportion to the power to be delivered. The engine is already extensively in use driving Edison illuminating plants with highly satisfactory results.

Charles Brunner, of Peru, Ill., has just completed a building of two stories, 170 feet long and 60 feet wide, with an "L"



Figs. 3 and 4.—Governor Details.

NEW TAYLOR HIGH-SPEED AUTOMATIC ENGINE.

traction. The crank-shaft and crank-pin are of steel. All bearings have liberal wearing surface. The piston is fitted with an effective special style of self-adjusting packing, which runs with very little friction. The piston rod is of steel, and is screwed into the cross-head. It is secured by a jam-nut and locking screw. Metallic packing is used in all packing boxes.

The governor, shown more in detail in Figs. 3 and 4, is simple and effective. Its action on the valve is instantaneous and positive. The full throw of the eccentric is accomplished with less than an inch movement of the weights, so that extreme variation of loads from nothing to the full capacity of the engine cannot, it is claimed, cause any appreciable variation in the speed, there being only a slight change in the speed of the weights, necessary to move them through so short a distance. Stiff springs and moderately heavy weights are employed, producing a decidedly prompt action of eccentric. A very important device is used in connection with the springs and weights, which overcomes all racing of engine. By its use a very sensitive adjustment of springs and weights can be made, and perfect regulation of speed obtained. This attachment is a vane which revolves in a closed case filled with oil, and is attached to the eccentric by a toothed rack and pinion. The movement of the weights propel the vane in the oil,

run either over or under, and can be adjusted for any speed within 10 per cent. either way, and should any part of it break the eccentric will close off the steam, preventing the engine from "running away." The governor is independent of the band-wheel. The latter can thus be moved on the shaft to bring it into alignment with the pulley to be driven, and the trouble of having oil flying over the belts is avoided.

The springs act by compression. In Figs. 3 and 4 A represents the eccentric, pivoted to the arm of the wheel B at C; D is a sleeved arm that revolves on the limb of the wheel B, and is connected to the eccentric by the pin E. The weighted lever F is pivoted to the rim of the wheel B at G and by means of links H to the arm D. The weights are secured to the lever F, and, owing to centrifugal force, act on the eccentric through the arm D. The vane case is marked J, and is secured to the arm of the wheel B, with toothed wheel in position, and connected directly to the eccentric by the rack K. The springs I, as already remarked, act by compression, and when the load of the engine is increased they overcome the centrifugal force of the weights, and increase the throw of eccentric, which admits more steam, and holds the engine to a constant speed. As the load of the engine becomes lightened, the weights act against the

extension of 40 feet. The entire outer walls are constructed from "fire-proof tile," manufactured by the Pioneer Fire-proof Construction Company, of Chicago. The ground floor will be used for an office, machine shop and the scale finishing department. The top floor will be utilized for drawing-room, pattern-room and carpenter shop. He is now engaged in tearing down and remodeling his foundry, so that his floor space will be fully again as large. This building when completed will be 60 x 100 feet, one story high, and well lighted and ventilated. The walls will be of fire-proof tile and the roof of asbestos. He employs about 70 men the year round, but when all improvements are made will increase his force to perhaps 100. Mr. Brunner is delivering his second order of eight boilers to the Spring Valley Coal Company, 75 horse-power each, making 22 in all that he has built for this company in the last three years. He is also at work on four flue boilers, 54 inches in diameter, 28 feet long, 75 horse-power each, for coal mines in Montana. His scale department is busy on railroad scales, some of them for the same coal companies, and he also has booked numerous orders for his portable Acme and wagon scales from various parts of the West. He has recently built a number of fan engines and special machinery for mines in Illinois and other Western States. As soon as he can

get his new machinery in place he will commence the manufacture of a line of novelties in calesthenics.

Torpedo-Boat Riveting.

In view of a recent report touching the defective riveting of an English first-class torpedo boat, which became apparent while on a voyage to China, the *London Engineer* of May 11 directs attention to the method of riveting best suited to such vessels, in which, as is known, the thinnest possible plating is adopted for the sake of lightness:

The universal practice in shipbuilding, remarks our contemporary, is to put the rivet through the plates from the inside of the hull, and hammer down on the outside. In the case of torpedo boats or any lightly plated vessel an outside countersink clearly cannot be deep, and it is in this countersinking that the weakness of riveting thin plates together really lies. Although, from the high standing of the builders, we do not for one moment attribute defective workmanship as the

Steamship City of New York.

The Inman steamship *City of New York* is the latest addition to the Atlantic fleet, and her achievements on her first trip over from Liverpool show that she is a wonderful vessel. According to the log she steamed 2794 nautical miles in 6 days and 21 hours, deducting for 8 hours 59 minutes, during which, on August 3, she was hove to while the circulating pumps were being repaired and for a few other minor delays. This makes an average speed of about 16.93 knots per hour for the entire actual steaming time. The ship left Queenstown on August 2, passing Roche's point at 8.41 p. m., Irish time, and she cast anchor off Sandy Hook at 3.43 a. m., New York time, 10th inst. Her daily runs were as follows: Beginning August 3, noon, 271, 168, 382, 420, 441, 425, 446, 241. Seventy revolutions per minute was as high a rate of speed as was attempted, and 85 per minute is the rate which she is expected to reach in the future. The highest run of the *Etruria* is said to have been 502 knots. The *City of New York*, it is predicted, will make 520 knots within the next two or three trips,

per dust, which is obtained by shaking a solution of sulphate of copper with granulated zinc. The temperature of the solution rises considerably and the metallic copper is precipitated in the form of a brownish powder—20, 30 or 36 parts of this copper dust, according to the hardness desired, are placed in a cast iron or porcelain lined mortar and well mixed with some sulphuric acid having a specific gravity of 1.85. Add to the paste thus formed 70 parts (by weight) of mercury, constantly stirring. When thoroughly mixed the amalgam must be carefully rinsed in warm water to remove the acid and then set aside to cool. In 10 or 12 hours it will be hard enough to scratch tin. When it is to be used it should be heated to a temperature of 700° F., when it becomes as soft as wax by kneading it in an iron mortar. In this ductile state it can be spread upon any surface, to which, as it cools and hardens, it adheres very tenaciously.

The Berrenberg Rotary Pump.

A new rotary pump, known as the Berrenberg pump, has recently been brought out in Boston, the makers being the Boston Rotary Pump Works, 46 Oliver street, and the selling agents, Messrs. Gould & Lord, 82 Water street, both of Boston.

The peculiarity of the pump lies mainly in the pistons, each piston being a circle, from which four small semi-circular sections have been cut. In two of the semi-circles, opposite each other, tubes are bolted through from the semi-circular spaces left vacant. When the pistons revolve the tubes for boxes, as they are called, of one piston fit into the vacant spaces of the other piston with perfect accuracy, and the circumferences of the pistons being always in contact with each other there is at no time in the course of their revolution any chance for much leakage. Moreover, there is no grinding of gears, but an easy and comparatively frictionless and noiseless motion. As all the lines of the working parts are circles, it is claimed that they can easily be built to fit with greater accuracy than any other form. Another great point of advantage is claimed to lie in the fact that, in case of wear from long service, they can readily be made as good as new by simply removing the tubes or boxes and putting a few thicknesses of paper packing in the seat, or else by turning the tubes a little so as to present a new surface to the point of contact with the case. The pump will also pump equally well either one way or the other, and, in case liquid containing mere or less solid matter—such as sand, tan or dirt—is to be pumped, by connecting the suction pipe at the top and the discharge at the bottom, and running the pump the other way, good results are claimed, all solid matter being carried through without clogging. The pump is double-gear, and has inside and outside bearings, so as to take all possible strain off the pistons. The outside bearings are taper bearings, so that any wear in bearings or shaft may be taken up and the shafts always kept true. It is claimed, further, that owing to the circular form of the pistons the pump can be run at a high speed with little friction and noise. This feature of the pump renders it particularly well adapted for use in connection with electric motors, for running elevators, pumping in mines and other places where an electric motor can be used to advantage. The pump was awarded a silver medal at the exhibition of the Massachusetts Charitable Mechanics' Association in Boston, in 1887.

O. W. Potter, president of the North Chicago Rolling Mill Company, sailed from New York for Europe on the 8th inst. to take a month or two of needed rest.

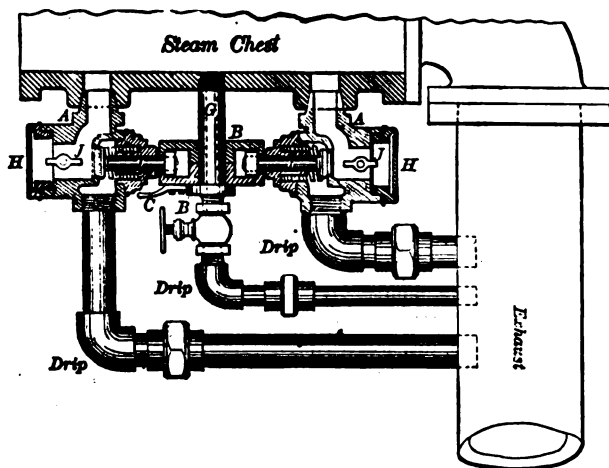


Fig. 5.—Automatic Relief Valve Rigging, Taylor Engine.

cause of the leakage in No. 35, still we think it may rather be looked for in the system than from any other cause. In our issue of the 13th ult. we illustrated a torpedo boat built by Messrs. Yarrow & Co. for the Chinese Government, and in Admiral Lang's report of the voyage out, during which very heavy weather was encountered, he states: "Every one who saw her must have great confidence in her strength, as I found on her arrival that she had not strained in the least, and had not leaked a drop of water." Owing to this fact we would draw attention to the mode of riveting adopted by the builders of this vessel. Instead of passing the rivet in from the inside and hammering down on the outside, as usual, they have rivets specially made with countersunk heads, these being passed through the plates from the outside and hammered down inside, which admits of a fairly substantial head being formed, because in this case the head need not be flush. By this plan a definite amount of countersink is insured, because it is far easier for the workman to countersink the hole so that the head fits well in than to file off that portion of the head which otherwise would project. Moreover, a countersunk head made out of the solid is far more trustworthy than if formed by being hammered down cold. On the other hand, if the rivet is hammered down on the outside, in order to make the surface smooth, it often happens that very nearly all the head is ultimately filed off, and in reality little or nothing is left to hold by.

but is not expected to develop her full speed until she shall have made a number of voyages. The *Etruria*'s best record was not made until she had been running several years. The builders have contracted to produce a vessel which shall have 20,000 horse-power, which shall run upon an average 20 knots an hour, and which shall under heavy penalties in the form of fines be able to cross from land to land in 5 days and 15 hours.

The cost of the *City of New York* is something over \$1,750,000 or £350,000 sterling. Her owners receive a subsidy from the British Government of \$50,000 a year for the privilege of being able to take the vessel in the event of war. Besides this the revenue from the English mails amounts to \$90,000 a year for the whole line. For the sake of completeness in noticing this initial trip of the *City of New York* we repeat the figures heretofore given in these columns, showing her general dimensions. She is 565 feet long over all, with a breadth of 63½ feet. She is 42 feet deep. From the bottom of the keel to the top of the captain's bridge is 70 feet, the height of many a good business block.

A New Soft Solder.—According to a current paragraph a soft alloy which adheres so firmly to metallic, glass and porcelain surfaces that it can be used as a solder, and which is invaluable when the articles to be soldered are of such a nature that they cannot bear a high degree of temperature, consists of finely pulverized cop-

Fire Risks of Electric Lighting.

M. Mascart recently performed before the French Physical Society a number of experiments illustrating the possible dangers of fire from electric light. In introducing the subject, he stated that it was necessary in electric light installations to take precautions against the undue heating of the conductors, and to avoid the risk of materials being ignited by the heat generated in the lamps. In the case of insulated wires laid beneath moldings, the heat generated was generally dissipated by conduction which kept down the temperature of the wire and its covering. But an excessive current might destroy the insulation and inflame the wood. An experiment was made with a wire of 1.2 mm. in diameter, laid on a block of wood and covered with another block. This wire would, in ordinary practice, carry a current of 4 ampères, but in this experiment a current of 40 ampères was passed before it commenced to carbonize the wood. With a much greater current the wood was inflamed at a point where the wire was uncovered, as between the boards the lack of air prevented ignition.

In order to see what amount of danger was to be expected from the lamps themselves the following experiments were made: 1. The globe of an arc lamp was covered with several thicknesses of a light fabric of green tulle. 2. A glow lamp of 32 candle-power was covered in a similar manner, the folds of the fabric being pressed on the lamp by an india-rubber band. 3. An incandescent lamp was covered with a cotton hood. 4. A glow lamp was covered with a similar hood of black silk, which was surrounded by another of velvet. 5. A lamp was covered with a layer of white wadding, the gummed surface of which had been removed. 6. Two glow lamps were covered with layers of wadding, white in one case and black in the other. 7. A lamp of 32 candle-power was placed in a vertical fold of an old theatrical scene; and finally, 8, a lamp of 300 candle-power was laid on a similar scene. In cases 1, 2, 5 and 7 no carbonization nor excessive heating was caused for 20 minutes. In case 8, the scene commenced to carbonize without flame at the end of 1½ minutes, and at the end of 2 minutes the envelope of the lamps in 5 burst into flame, and in about 6 minutes the velvet calotte in experiment 4 commenced to burn slowly; this experiment was prolonged without breaking the lamp, but the globe was deformed. The cotton hood in 3 was partially carbonized at the end of 10 minutes, but was not set on fire.

Paper Tests.—It has often been stated that the cause of paper becoming brittle or tender is to be found in the presence of alum or sulphate of alumina in the paper. Herr C. Wurster's observations, according to the *Papier Zeitung*, extending over ten years, tend to the conclusion that neutral or basic sulphate of alumina exercises no decomposing influence at ordinary temperatures on paper, whether size be present or not, but that sulphate of alumina has a strong caustic action if chlorides, such as those of sodium and calcium, be present, especially at higher temperatures. In this case an injurious action on the paper arises from the formation of aluminium chloride or free hydrochloric acid, which acts by abstracting hydrogen, or the elements of water, from the cellular substance. The manufacturer should therefore endeavor to remove, as far as possible, by washing from the fabric, any sodium or calcium chloride resulting from the bleaching powder. It is accordingly not advisable to kill the bleach by antichlor without subsequent washing. From these considerations, the testing of paper should include a qualitative or quantitative exami-

nation of the chlorides present, which, the *Journal of the Society of Chemical Industry* says, have hitherto been regarded as quite harmless.

The Cost of Rolling Wire Rods.

In response to the suggestion of the Finance Committee of the Senate, during the hearing accorded to the iron rod manufacturers of the United States, Mr. George T. Oliver has submitted the following statements of costs of rolling wire rods at the works of the H.P. Nail Company, the Braddock Wire Company, the Oliver & Roberts Wire Company, Limited, and the Gautier Steel Department of the Cambria Iron Company:

Cost of making Steel Wire Rods in 1887 by the H.P. Nail Company, Cleveland, Ohio.

	Gross ton.
Labor in and around rod mill.....	\$4.53
Material for supplies, repairs, coal and water.....	2.57
General expense—traveling, office, taxes and insurance.....	.60
Waste, less value of scrap.....	1.75
Interest on plant.....	.50

Total cost.....\$9.95

The item "material for supplies," &c., is practically mostly labor which is put on by other parties. The "general expense" item is principally expenses paid for traveling, which is labor. I believe the actual labor in making a ton of rods from billets amounts to at least \$7.50, for what is coal or iron worth without the labor put on them? Nothing.

Statement of Braddock Wire Company's (Rankin, Allegheny County, Pa.) cost of Manufacturing No. 5 Steel Wire Rods from 4-inch Square Billets, June 1, 1887, to June 1, 1888.

	Gross ton.
Labor, rolling account.....	\$4.23
Wear and tear.....	.75
Interest at 6 per cent. on investment, on basis of 20,000 tons output per annum.....	.47
Expense account.....	.96
Fuel and supplies.....	.85
Basing steel at \$30 per ton net, furnace and rolling waste at 8 per cent.....	2.61

Total cost of producing No. 5 wire rods.....\$9.86

Statement of Oliver & Roberts Wire Company, Limited, Pittsburgh, Pa.—Cost of Manufacturing No. 5 Wire Rods during the Fiscal Year ending January 31, 1888.

	Per ton.
Labor and superintendence.....	\$4.15
Waste (after deducting returns from scrap, &c.).....	2.49
Maintenance, supplies and fuel.....	1.05
Taxes and interest.....	.85

Total.....\$8.54

Average cost of billets (4 inches square). 31.72

Cost of rods.....\$40.26

Cost of Manufacturing Wire Rods at the Rod Mill of Gautier Steel Department, C. I. Co., November 1, 1886, to November 1, 1887.

Billets consumed, 8610 gross tons, at an average price of \$33.65 per gross ton.....	\$289,862.52
Operating.....	\$37,478.67
Maintenance.....	11,834.09
	49,312.76

Total cost.....\$339,175.28

Less value of scrap.....2,522.11

Net cost.....\$336,653.17

Total product, 7960 gross tons. Average cost, \$42.29 per gross ton.

It will be observed that the cost of rolling rods at the latter mill is, therefore, \$8.64 per gross ton, exclusive of interest.

The Telephone in Siam.—The activity with which the Germans are pushing their trade into foreign countries receives many practical demonstrations. One is furnished by the consular report of Mr. Jacob I. Childs, United States consul at Bangkok, Siam, who writes as follows: "The plant for the telephone at Bangkok has arrived from Germany. I am informed by an electrical expert conversant with telephonic affairs that the instrument is much inferior to the American instrument, costs about five times as much, and has not near the power of the Bell; but as the control of

the matter was in the hands of a German who has a friend at court, no one else was consulted in the matter, and he had the power to do as he pleased. As it is, the Germans are getting a strong hold here with the officials, which is somewhat galling to the English and French residents, who in the past had a monopoly of the business."

Licenses for Engineers.

Referring to the recent agitation in England to get an act of Parliament passed to make licensing of engineers compulsory, the *London Engineer* says:

There are practically no boilers in charge of men utterly ignorant of their management, while the fact that so long as a boiler has water enough in it it is very difficult to blow it up, may be taken as contributing to the safety of steam users and their neighbors. The whole weight of the arguments for and against the granting of certificates turns on these points, and it is not without interest to note the entire absence of all data of a trustworthy character intended to prove that boilers are, under the existing system, persistently intrusted to men quite ignorant of their duties. Practically the whole argument is based on a theory and emanates, with a few exceptions, from men who are quite in the dark concerning the conditions under which steam is made in this country. It may do some good if we put the facts before them in the simplest possible way.

In the first place, we have to eliminate boilers in steamships and locomotive boilers; these are always put in charge of men whose knowledge is not for a moment in doubt. We have next to do with boilers in mills, and here again there can be no question of competence raised. Boilers in iron works and at mines are, with very rare exceptions, in charge of engineers who certainly know all about them; so we may eliminate them. There remains, then, nothing but the little boilers found in small sawmills, brickworks and so on, and portable and traction engines and crane engines. Concerning the last we may say again that they are never put in charge of men who do not know how to manage them, sometimes they know too much. It is doubtful if the small stationary engines ever get into wholly incompetent hands. Engine drivers and firemen, even of the lowest type, go through some sort of training as lads before they are permitted to take charge of a boiler. If the numbers of wholly untrained men who, according to the advocates of the certificate system, must be in charge of boilers was as great as is stated, then there ought to be about ten explosions for each one of which we have now. As we have said, the whole theory is based on a fallacy; at all events, that is what the available statistics go to show.

Wood Pavements.—These pavements have met with greater success in Europe than in America, because they are laid upon a foundation of concrete, and receive more attention in the way of maintenance than is given them here. American yellow pine, owing to its hardness and resinous quality, has been the favorite wood in Berlin and Hamburg. A report from Berlin states that the Fredericks bridge was paved in March, 1879, with yellow pine and is still in a good condition, while the approaches, paved with granite blocks, have since required twice repaving. The Opern platz in front of the Emperor's palace was paved in 1882 partly with yellow pine and cypress at the point where the traffic is greatest. At other points stone blocks were used and were laid at the same time. To-day the area having the wood pavement is the one which is best preserved.

New Steam Wrecking Pump.

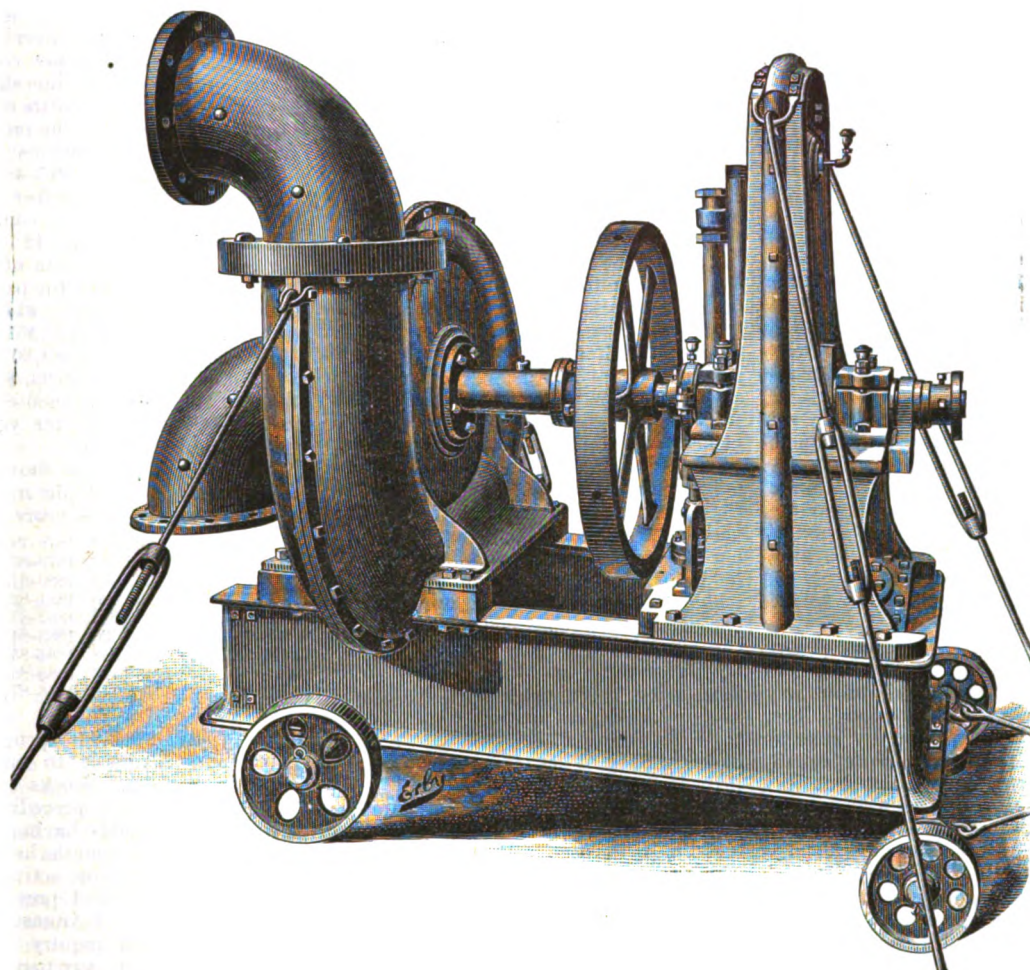
We show on this page a new steam-pump for wrecking purposes, built by Messrs. Goulds & Austin, of Chicago, Ill. It is of the centrifugal pattern, and has an enormous capacity, the 12 size, with 14-inch suction and 12-inch discharge, being capable of raising 12,000 gallons, or say 400 barrels, per minute. As seen in the cut, the driving-engine is placed on the same frame as the pump, the frame being of wrought iron and the whole outfit being mounted on wheels. Connection with the pump is direct. The shaft having heavy thrust-bearings and the piston being guided above and below with

steel bridge, 220 feet long, and ample in size to accommodate any amount of traffic. The bridge was built and paid for by the North Chicago City Railway Company. The old Wells street bridge was removed the latter part of March, and work on the new improvement was commenced shortly afterward. The work has been done very quickly, considering the size of the bridge.

New Iron and Steel Warehouse at Chicago.

Early in 1887 a description was published in these columns of a new warehouse, which had been built at Chicago for the

tracks extending in front and immediately in the rear of them give direct connections with every road running out of Chicago but the St. Paul, and it is easily reached by a connecting line. The first floor in each case is on a level with the car floors, which facilitates loading and unloading. For shipment by rail the location and arrangement of the warehouses are unsurpassed, while they are also within easy reach of local freight depots for small hauling. Mr. Williams has found in his experience of 1887 and 1888 great advantages accruing from the possession of a warehouse in Chicago carrying large stocks of goods, and in extending his facilities expects to greatly enlarge his trade. Not-



NEW STEAM WRECKING PUMP, BUILT BY MESSRS. GOULDS & AUSTIN, CHICAGO, ILL.

V-shaped guides; there is no lost motion or unnecessary friction.

These pumps are usually furnished with from 20 to 30 feet of suction-pipe in short pieces, or with a slip-joint so as to adjust the suction to vessels having different depths of hold. In case of a wreck a tug carrying one of these pumping rigs is sent to the scene, and after the vessel is raised to the surface the pump and a boiler are transferred from the tug to the wreck. The pump is, at present, built in four sizes, numbered 6, 8, 10 and 12, but larger sizes can be furnished according to specifications.

Two new swing bridges over the Chicago River in the heart of the city of Chicago are about completed. One is at Eighteenth street and one at Wells street. Both are built of steel and both are the work of the Keystone Bridge Company. The Eighteenth street bridge cost \$83,300 and the Wells street bridge cost \$59,000. The latter is one of the finest bridges on the river. It is a double roadway, steam

Hartman Steel Company and the Apollo Iron and Steel Company by Nelson B. Williams, their Western agent. It was supposed at that time that sufficient room would be thus supplied for a considerable expansion of the business of these companies, but it was, of course, not known how rapidly their business would grow. The progress of months demonstrated the necessity of additional room, and a second warehouse has accordingly just been erected by Mr. Williams on the opposite side of Newberry avenue from the old warehouse on the corner of Fifteenth street. The new structure is built of brick and stone, occupies a site 150 feet long by 100 feet wide, and is three stories high. It is very substantially constructed in every respect, being modeled after the first warehouse, which proved to be very satisfactory in enduring the strain of the heavy materials stored in it. There are 79 piers in the new warehouse to support the first floor, each capable of sustaining 200 tons.

The location of these warehouses is most excellent for business purposes. Railroad

withstanding the depression of the past few months the volume of business handled by him has steadily grown, because he has been ready at all times to ship promptly and in any quantity. The full line of products of the Hartman Steel Company and the Apollo Iron and Steel Company is represented in his stock. The office will be continued in the Rookery building on the corner of La Salle and Adams streets.

A corrected statement of the financial position of the Calumet & Hecla Mining Company, on April 30th, is as follows: Assets—Cash at mine office, \$67,127.64; cash at New York office, \$7746.65; cash at Boston office, and copper at 14 cents, \$2,407,449.57; bills receivable at mine, \$31,357.63; total, \$2,513,681.49. Liabilities—Drafts in transit, \$61,139.21; employees' aid fund, \$2348; bills payable at mine, \$146,285.14; bills payable at Boston, \$100,000; machinery contracts, "estimate," \$200,000; new smelting works, \$50,000; total, \$559,772.35; balance assets April 30, 1888, \$1,953,909.14.

The Iron Trade of Cincinnati.

Chamber of Commerce Report.

Through the courtesy of Sidney D. Maxwell, superintendent of the Cincinnati Chamber of Commerce, we have received advance sheets of the last annual report, which Mr. Maxwell has for many years made the model of such documents. We quote from it the following review of the trade:

MANUFACTURED IRON.

The year has been one of great activity to manufactured iron. Throughout the fall and winter and early spring the mills tributary to this city were generally running at full capacity. Profits were not large, yet there was a margin. Prices, too, were somewhat better. There was something of a lull after the warm weather had set in, and prices, in some classes of manufactured iron, were from \$1.50 to \$2 per ton lower. The apprehension of labor troubles, however, notwithstanding largely increased production, served as a check to any general decline, so that the year closed with the feeling that the approaching season would be one of equally favorable conditions, unless disturbed by actual or prospective legislation. At the close of the year Merchant bar iron was quotable at \$1.80 per 100 pounds, for large and desirable orders. Tank iron was quotable at \$2.40, and sheet iron, heavy to light, \$2.50 to \$3, prices having been little better, if any, in these articles at the conclusion than at the opening of the year. Boiler plate iron, once occupying a prominent place in the manufactured product, has been almost entirely supplanted by steel, such as was used having been quotable, at the close, at about \$3 for No. 1 charcoal boiler plate, steel being quotable at the same price.

Allusion was made in previous reports to the increase that had taken place in late years in the use of steel for various purposes for which iron had previously been exclusively used, encouraged by superior quality and by prices that were equally low. In some departments of ironwork it has amounted almost to a complete transformation, with every indication that the encroachment upon manufactured iron has little more than begun. In the matter of boiler plate, the conquest has been so complete as to practically remove such iron, for the usual purposes, from the list of manufactured iron. The receipts of manufactured iron and steel, at this city, in the past year, were the largest ever known, having aggregated 155,885 tons, in comparison with 137,203 in 1885-86, 112,109 in 1884-85, and, approximately, 9202 40 years ago; and the shipments 139,393 tons, compared with 104,311 in 1885-86, 89,745 in 1884-85, and, approximately, 8236 40 years ago.

A very important industrial event of the year has been the determination of parties in this city, of large capital and wide experience, who for years have been prominently engaged in the same business here, to erect iron works for the manufacture of iron pipe and heavy castings on an extraordinarily large scale. The new works have been located on the Ohio River below the city, lands amounting to 108 acres having been purchased, and the improvements already begun. It is the intention of the projectors to furnish the most complete pipe plant in the world, where the best physical results will be attained at the minimum cost. Both railway and water transportation will be available; extensive buildings will be erected; houses for employees provided, and, in general terms, provision made for the most economical administration, and for the establishment of a community of working forces that shall be supplied with everything

necessary to their comfort—the object being to lay the foundations for an enterprise alike valuable to the employer and the employed. The locality is to be known as Addyston, after the public-spirited citizen who has conceived of the undertaking and formulated the plans for the accomplishment of the work. It is well known that iron pipe manufactured here has for years been distributed to almost all parts of the country, and this new project will give Cincinnati a still stronger position in this respect.

PIG IRON.

The year has been one of unusual prosperity to the pig-iron business of the country, the increased activity which marked the preceding year having also continued through 1886-87. The production of the country exceeded any previous year, having been greater than that of Great Britain 17 years ago, and destined eventually not only to reach but pass the output of that great empire of iron production. It is interesting to note that 32 per cent. of this increase in the past year is found in States that are immediately tributary to Cincinnati, these States now producing more iron than was produced in the whole country in 1870. The work of the development of the iron resources of the South has gone on with remarkable activity; the erection of new furnaces of large capacity, backed by ample capital for the prosecution of the work; the activity displayed by furnaces already in operation; the valuable character of the iron, and the evidences furnished from time to time of the wonderful resources of that wide district in this commodity, are all salient features of the time. Closely related as are the Southern furnaces to Cincinnati, whatever, in general, has enlarged their business has also made its impress upon the trade of this city, which, in this commodity, now occupies one of the most conspicuous positions in the country—no other market certainly having such a great variety of irons to present, none being more centrally located, nor provided with ampler means for distribution; none where business is in the hands of men of larger experience, enterprise and financial ability.

The business in the past year shows the largest work ever performed by the trade here, both in tons and aggregate value. The total production of pig iron in the States in which Cincinnati is immediately interested, comprising Alabama, Georgia, Kentucky, Indiana, Michigan, Missouri, Ohio, Tennessee and West Virginia, in the calendar year of 1886, was 1,872,988 net tons, compared with 1,283,247 in 1885 and 716,910 10 years ago. Of the quantity produced in the past year, there were, of bituminous coal and coke iron, 1,529,582 tons, compared with 981,073 in 1885; and of charcoal, 343,406 tons, in comparison with 302,174 in 1885. The total production of pig iron in the United States in the calendar year of 1886 was 6,365,328 net tons, compared with 4,529,869 in 1885, 2,093,236 10 years ago, 1,350,343 in 1866, and 883,137 in 1856. In 1840 the entire production of the country was 286,903 tons. The present product of the country largely exceeds that of the whole world 40 years ago. The sales of pig iron in Cincinnati from first hands, according to confidential returns submitted to the superintendent of the Chamber of Commerce, aggregated in 1886-87 667,773 tons, in comparison with 511,426 in 1885-86, 406,998 in 1884-85, 427,934 in 1883-84, 417,635 in 1882-83, 386,510 in 1881-82, 334,702 in 1880-81, 248,519 in 1879-80, 212,281 in 1878-79, 125,912 in 1877-78, 129,194 in 1876-77, and 137,646 in 1875-76—these figures embracing also iron sold for direct shipment from the furnaces to the places of consumption, alike with such as may have touched this city. It will be observed that the business here in 10 years

measured by physical results has much more than quadrupled.

The quantity of pig iron actually received here shows also an increase over any preceding year, having aggregated 266,005 tons, in comparison with 195,899 in 1885-86, 154,987 in 1884-85, 163,440 in 1883-84, 141,587 in 1882-83, 156,340 in 1881-82, 137,164 in 1880-81, and, approximately, 35,660 in 1866-67, and 15,868 40 years ago. The actual shipments were 203,186 tons, compared with 145,852 in 1885-86, 111,652 in 1884-85, 121,659 in 1883-84, 106,819 in 1882-83, 100,983 in 1881-82, 97,665 in 1880-81, 64,409 in 1879-80, and, approximately, 14,571 20 years ago, and 3462 in 1857-58, which is the earliest published record of the shipments of this commodity. The actual receipts in the past year, it will be observed, have increased over 1885-86 70,106 tons, or about 35 per cent. The increase in one year is thus shown to have been greater than the entire receipts in any year prior to 1871-72, the receipts 20 years ago having been 35,660 tons; 30 years ago, 29,484 tons, and in 1845-46, the earliest record made at the Chamber of Commerce in the movement of this commodity, 13,685 tons, an increase in 42 years of 1843 per cent. The total value of the sales of pig iron in this city in the past year aggregated, approximately, \$14,514,046, in comparison with \$9,737,551 in 1885-86, \$7,667,842 in 1884-85, \$9,307,564 in 1883-84, \$10,060,827 in 1882-83, \$10,698,596 in 1881-82, \$9,006,830 in 1880-81, \$8,708,105 in 1879-80, \$3,463,173 ten years ago, and \$1,760,000 in 1868-69.

The following table shows the annual approximate sales of pig iron at Cincinnati for 19 commercial years:

1868-69.....	\$1,767,000	1878-79.....	4,583,146
1869-70.....	2,469,000	1879-80.....	8,708,105
1870-71.....	2,667,000	1880-81.....	9,006,830
1871-72.....	6,500,000	1881-82.....	10,698,596
1872-73.....	7,062,930	1882-83.....	10,060,827
1873-74.....	3,385,326	1883-84.....	9,307,564
1874-75.....	3,432,348	1884-85.....	7,667,842
1875-76.....	3,463,173	1885-86.....	9,737,551
1876-77.....	183,1743	1886-87.....	14,514,046
1877-78.....	2,875,830		

The year 1886-87 opened under circumstances favorable to increase in the value of pig iron. Stocks of good iron, at the close of the preceding year, were low, foundry grades having been scarce. The condition for months had been preparing the way for a more active demand and better prices than had prevailed, so that during the month of August there was decidedly increased inquiry for pig iron, without, however, any particular impression being made upon prices. Early in October the market was stronger, and prices showed some improvement in stone-coal iron, hot blast charcoal iron soon following in the wake of the advance. No. 1 strong hot blast stone-coal iron, which had been quotable at \$17 to \$18.50 per ton, steadily advanced until reaching \$21.50 to \$23, soon after the advent of the new calendar year, No. 1 hot blast charcoal iron advancing in the same period from \$20 and \$21 to \$24 and \$25.50. Hanging Rock car-wheel iron advanced, in the same period, from \$24 and \$27 to \$29 and \$31. No. 3 foundry iron advanced, from September 1, 1886, to January 1, 1887, from \$14 to \$20, the advance, however, in other grades, as appears from the figures, not having been so great.

After the first of January, there was a noticeable lull in the iron market. The uncertain operations of the Interstate Commerce law, the restless condition of labor, largely increased production in this country, and free importations, stimulated by the higher prices, all combined to throw a feeling of uncertainty over the iron market. Prices remained without quotable change for a number of months, and yet there was a gradual weakening of the tone of the market, which before the close of March began to make itself felt in prices.

No. 1 Northern iron, which had been quotable at \$22.50 to \$23, lost 50 cents per ton at the close of that month. Southern iron yielded somewhat more reluctantly, and yet by the middle of April it had sustained a decline of \$1 per ton. Charcoal irons, about the same time, began to give way in price, the quotation having been lowered \$1 per ton, to be followed by a further decline of 50 cents to \$1 per ton at the close of the month. From this time on until July the market steadily lost ground, No. 1 strong hot-blast stone-coal iron having been quotable at \$19.50 to \$21 during the latter part of May, June and the larger part of July. No. 1 charcoal iron in the same time declined from \$24 and \$25.50 to \$22 and \$23, both irons, it will be observed, having lost about one-half of the advance. Car-wheel iron seemed to hold its position with more tenacity, for, after having advanced to \$29 to \$31, by the middle of April it declined to \$28 to \$30, and remained thence without quotable change until the close of the commercial year. In August the market again showed increased strength, strong No. 1 hot-blast stone-coal iron, both Northern and Southern, having advanced to \$21 to \$21.50, charcoal iron being quotable at \$24 to \$24.50, a part of the loss in value having thus been regained. The advance, however, was destined not to be of long duration. Whatever expectations there may have been that we should witness another period of undue expansion in the values of iron were largely dissipated by the experiences of the year, for, with the largely increasing capacity of our furnaces in the South, and the manifest ability to profitably produce iron at low prices, the conditions were not favorable to enormous inflation of value, with the consequent disturbance to prices, which would inevitably ensue, in almost all kinds of production into which iron enters.

The average quotation for No. 1 hot-blast charcoal iron, in the past year, was \$22.95 per ton, in comparison with \$20.46 in 1885-86, \$20.93 in 1884-85, \$23.43 in 1883-84, \$25.63 in 1882-83, \$28.45 in 1881-82, \$26.91 in 1880-81, \$35.04 in 1879-80, \$21.59 in 1878-79, \$22.84 in 1877-78, \$24.14 in 1876-77, \$25.16 in 1875-76, \$29.28 in 1874-75, \$39.21 in 1873-74, \$55.33 in 1872-73, and \$46.74 in 1871-72. The average quotation for strong No. 1 stone-coal iron was \$20.54 per ton, compared with \$17.96 in 1885-86, \$17.33 in 1884-85, \$20.40 in 1883-84, \$22.82 in 1882-83, \$25.96 in 1881-82, \$23.67 in 1880-81, and \$31.90 in 1879-80, the quotations for both Northern and Southern irons entering into the averages in the later years. The average quotation for No. 1 car-wheel iron was \$28.31 per ton, in comparison with \$25.50 in 1885-86, \$26.41 in 1884-85, \$28.46 in 1883-84, \$30.42 in 1882-83, \$36.50 in 1881-82, \$39.30 in 1880-81, and \$48.83 in 1879-80.

NAILS.

The strike among the nailers having entirely disappeared, the business of the year to the manufacturers of nails was an active one. Stimulated by an advancing market, there was an active demand throughout the fall and winter, 10d. nails in large lots, which had been quoted at \$2.08 in this market, having advanced to \$2.58 by the last of January, when an attempt was made to still further push up prices, which had already attained those prevailing in 1883-84. This, however, proved unsuccessful. There was, throughout the fall and winter, a generally strong feeling, and a great many nails were bought on speculation, there having been during the month of February doubtless the largest business in nails that was ever transacted in this city. After the 1st of April, however, the demand weakened, and a decline set in, which finally carried

10d. nails down to \$1.98 about the 1st of June, the lowest price which had prevailed in this market since 1878-79, and in striking contrast with \$5 per keg, at which such nails had ruled in the midst of the excitement of 1879-80. Late in June prices were advanced to \$2.08, remaining thence without change until the close of the year.

The average quotation for 10d. nails in this market, in large quantities, was \$2.24 per keg, in comparison with \$2.258 in 1885-86, \$2.177 in 1884-85, \$2.46 in 1883-84, \$3.165 in 1882-83, \$3.314 in 1881-82, \$2.819 in 1880-81, \$3.60 in 1879-80, \$2.017 in 1878-79, \$2.226 in 1877-78, \$2.67 in 1876-77, and \$2.797 in 1875-76. The year's work makes the largest showing in the history of the city, the receipts having aggregated 615,867 kegs, compared with 529,511 in 1885-86, 388,025 10 years ago, 331,278 in 1866-67, 112,215 in 1856-57, and 54,918 40 years ago. The shipments were 523,206 kegs, in comparison with 455,959 in 1885-86, 296,014 in 1876-77, 262,517 in 1866-67, and 48,866 in 1857-58, which is the earliest record made of the outward movement of this commodity. A noticeable feature of the time is the tremendous growth in the production of steel nails, which has increased in the whole country from 393,482 kegs in 1884 to 2,968,989 kegs in 1886, with the prospect that in 1887 the production of steel nails in the whole country would exceed that of iron. The entire production of iron and steel nails in 1886 was 8,160,963 kegs, of which the Wheeling district produced 1,858,551 kegs, the present production in this district being almost wholly from steel. Another noticeable feature has been the rapid increase of wire nails, the production in the whole country in 1886 having been about 600,000 kegs, with the promise of the quantity being considerably more than doubled in 1887.

STOVES.

The business in stoves has proceeded without marked changes from the preceding year. The production of Cincinnati doubtless showed increased results, but the year was one in which there was very active competition and slender profits. Early in the spring prices were advanced throughout the country, on certain classes, about 5 per cent., but it was not general in its application to all kinds of stoves, so that, coupled with the difficulty perhaps, in some instances, of even maintaining the advance that was sought to be established, the average increase was inconsiderable. The business of Cincinnati has been well maintained, and yet it cannot be said that the losses sustained by the long period of inactivity produced by the labor troubles of preceding years have been entirely repaired. Much of the lost ground has been regained, and there has been a wider distribution of our wares to the westward, especially to the Pacific Coast.

How the Castle Garden emigrant landing is owned and managed was stated officially by the president of the Emigration Commissioners before the Congressional investigating committee. The property of Castle Garden belongs to the City of New York. The commissioners have also 120 acres on Ward's Island. They have a hospital there. Objectionable immigrants find a resting place there until their cases are decided. The property is worth between \$2,000,000 and \$3,000,000. In 1882 it was decided that the State "head tax" was illegal, and therefore was discontinued. Then the commissioners borrowed \$200,000 from the Emigrant Industrial Savings Bank, giving a mortgage on the property on Ward's Island. Since 1882 the commission has acted as the agent of the Treasury Department, under a contract with the late Secretary Folger. The collector of the port

never acts, the witness said, with regard to suspicious persons unless he is notified by the commissioners. Since 1882 the collector employs his own inspectors in furtherance of the Contract Labor act.

Sale of Graff, Bennett & Co.'s Mills.

The Millvale and Clinton mills of Graff, Bennett & Co., of Pittsburgh, who made an assignment in the early part of the year, were sold at auction by order of the court on Thursday, the 9th inst. The first-named plant is located on the South Side and was built in 1846. It contains 7 double and 19 single puddling furnaces, 11 heating furnaces, 6 trains of rolls and 32 nail machines. The Millvale plant is located on the West Penn Railroad and was built in 1850 and destroyed by fire on December 11, 1881, and was rebuilt in 1882. It contains 10 Danks rotary puddling furnaces, 4 double, 1 double-double and 21 single puddling furnaces, 18 heating furnaces, 10 trains of rolls and one hammer. In 1886 an open-hearth steel plant was erected, containing two 15-gross ton Siemens-Martin open-hearth furnaces. The estimated value of the entire property is \$2,500,000. Unprotected creditors, whose claims amount to over half the indebtedness, appointed James M. Bailey and James W. Friend, of Pittsburgh, and Colonel Pickard, of Cleveland, to represent them, and Mr. Friend did the bidding. Judge Bredin, Thomas Carlin and Mr. Dickey, representing the mechanics' liens of \$50,000 against the mills, were also bidders. The bids ran the price up very slowly by \$250, \$500 and \$1000 bids, until Mr. Carlin bid \$26,000. He afterward withdrew this bid and the Friend syndicate was awarded the property for \$25,050 over and above the mortgages of \$625,000, or a total of \$650,050.

Before the sale commenced Jacob Reese gave notice that the Universal mill, lately in use by Graff, Bennett & Co., was not their property; that they had no right to use it, and that the patents covering it were held by him. Notices were read from the Butler Plank Road Company as to the occupation of part of that road, and also from the West Penn Railroad Company as to the occupancy by the mill of part of the old canal bed, which is now the property of the railroad company. There are many conjectures as to what will be done with the property. James W. Friend stated that the creditors had bought the property merely to protect themselves. Mr. John Graff, a member of the firm, said the amount paid for the property was not near the value. The Clinton mills, which cover 11 acres of ground, were worth twice the amount given, and the Millvale property, which occupies 28 acres of ground, he believes is worth fully four times the amount for which the entire property was sold. It seems to be the general impression that the firm will make some arrangement with the creditors by which they will be allowed to gain possession of the plants again and operate them.

Bids were opened at the Navy Department at Washington on Friday for material for use in the construction of the armored cruiser Maine, at the Brooklyn Navy Yard. The lowest bids for the principal articles were, for hardware, Albert Flagler, at \$9709; for wrought iron, H. B. Newhall, at \$1250; for flat wrought iron, L. H. Ross, at \$1097; for bolts and nuts, H. B. Newhall, at \$1109; for colored paints, W. B. Price & Co., of Baltimore, at \$1185.

During the first six months of the year 54,000 emigrants arrived in Canada, but of this total 40,000 crossed the border.

THE WEEK.

The engineers of the proposed merchants' bridge at St. Louis have made their report and the Merchants' Exchange are deliberating upon the amount that shall be subscribed in their behalf. The estimate for the bridge proper to comprise three steel spans of 518 feet each is \$1,210,000, and the total is put down as \$1,654,000. The total length of the bridge will be 2425 feet, or almost half a mile.

The bill prohibiting the landing of Chinese emigrants in this country, which was introduced in May by Senator Stewart, of Oregon, passed the Senate without a division. Chinese officials, teachers, students, merchants or travelers for pleasure or curiosity shall be permitted to enter the United States, but, in order to entitle themselves to do so, they shall first obtain the permission of the Chinese Government or other Government of which they may at the time be citizens or subjects. Such permission and also their personal identity shall in such case be evidenced by a certificate to be made out by a representative of the United States at the port from which the person named therein comes. The words "Chinese laborers" shall be construed to mean both skilled and unskilled laborers and Chinese employed in mining. No Chinese laborer in the United States shall be permitted, after having left, to return unless he has a lawful wife, child or parent in the United States, or property therein of the value of \$1000, or debts of like amount due him and pending settlement.

The Miners' and Mine Laborers' National Assembly at their annual meeting in Cleveland had before them the subject of resistance to the power of any combination formed against them. The Master Workman's address had the following: "It has become fashionable of late for labor organizations, our own among the number, to cry down and discourage the most effective method, offensive and defensive, that organized labor has, as yet, learned to use to secure their rights; and the method that is employed daily by organized capital with success. Through the medium of their association the operators of the East and West advance the price of coal in the markets 25 or 50 cents per ton, regardless of the consumers' ability to buy. That is 'business,' and the fact is heralded through our great dailies and copied by our labor papers as an evidence that the market is in good condition. The miners, through their organization, advance the price of their labor 5 or 10 cents per ton, and if they refuse to sell it for less it is a 'strike,' and the men who have the hardihood to make such a demand are expected to offer the 'public' an apology for the position they have taken, and are counseled that their only remedy is education. Last month the 'coal pool' struck the consumer for 25 cents advance and struck the miner for 6 cents reduction. If the miner is to be educated out of striking, what is to be done with the operator?"

As an indication of the rapid development of the Argentine Republic, the interesting fact is noted that since January, 1887, new banks have added \$52,500,000 to her banking capital, of which \$42,000,000 have been subscribed by citizens of the Republic. This increase of banking capital has been as great as that of the National banking system of the United States during the same period.

Technical and normal education are subjects that receive considerable attention in the annual report of the superintendent of the New Jersey State Board of Education. Mr. Chapman says: "Newark is the only city which has taken advantage of the law passed in 1881, granting to any city which

raised an equivalent amount an appropriation of from \$3000 to \$5000 for the support of schools for industrial education. The school in Newark has proved successful. Industrial schools have also been started on an independent basis at Montclair and Hoboken."

Coal from Mexican lands between Lampasas and Eagle Pass, in Texas, were tested at the coke ovens in Connellsville, Pa., in the interest of the Coahuila Coke Company, and the result is a belief that there is no longer any necessity for importing the English article at a cost of \$13 per ton. Equally good can be made on the spot for \$3 per ton.

The Dock Commissioners now have at their disposal \$2,000,000, and within two years expect to complete the proposed extension wharf improvements on the site of West Washington market and at other points on the North and East Rivers. Eighteen years ago, and prior to the existence of a Dock Commission, the city received an annual revenue from water-front property of \$300,000; now she receives \$1,300,000. The commissioners, therefore, contend that every dollar expended by them eventually returns a profit of \$2.

Senator Evarts, in an elaborate argument concerning the fisheries treaty, contended that the waters over which Canada claims exclusive jurisdiction are really the high seas, as much so as Baffin's Bay, Hudson's Bay or the Bay of Fundy, and that what is known as the three-mile line is merely a line of deference, a *linea de respectu*, a ribbon, as it were, drawn around the shores with all their sinuosities. No nation, he argued, had a right to exclude other nations from the enjoyment of the high seas, except by the concession of deference. The position which should be taken by this Government was to insist that the United States had always rejected the headland theory, and did not tolerate the claim of right on the part of Great Britain to make a bay by calling it a bay, and to shut out of it American fishermen.

Three hospitals for the bituminous coal miners in Pennsylvania, for which the State appropriated \$60,000, are about to be erected.

The plan of opening the coal and iron regions of Alabama from the sea, by means of a railroad from Mobile, is not only pronounced feasible by engineers, but is considered a safe commercial venture. A director of the proposed road says: "Our plan is to start this line from Mobile Point on the bay and run it direct through the rich coal and iron fields about Birmingham, where we will connect with other lines. At the starting point there is a depth of water of 26 feet, which will easily admit vessels from the Gulf, thus opening a short route from the West Indies to St. Louis and Chicago. The vessels as they land at the point can transfer their cargoes to the cars, and the goods shipped to that point can be easily placed on board the ships."

A second large gas well has been struck in the center of Allegheny's industries.

Another effort is making to resuscitate the Hudson River tunnel, upon which the indefatigable Colonel Haskin is supposed to have expended thus far upward of \$1,000,000. Mail advices report that the Bank of Scotland, as fiscal agent of the Hudson Tunnel Railway Company, of New York, announce that they will receive subscriptions for \$1,500,000 first mortgage 5 per cent. gold bonds of that company, maturing 1939, being part of the first issue of \$2,500,000, the remaining \$1,000,000 being reserved for allotment in the United States. The price of issue is £180 per bond of \$1000. The interest is guaranteed up to and including the coupon of

July 1, 1893, by deposit in the Bank of Scotland. The prospectus sets forth that excepting New York Central, which crosses the river at Albany, all the railways leading to New York from 48 States and Territories terminate at Jersey City, and these are barred from entrance to the city by the river. It is proposed to tunnel by two parallel tunnels, each 5600 feet long, 18 feet high and 16 feet wide, and of this total length, 2580 linear feet have been completed.

The Japanese Government have a novel way of raising revenue without giving offense. It merely intimates that in future, instead of estimating the pound sterling at 4.88 silver *yens*, its value shall be regulated by the three months' rate of drafts, and forthwith the duties are raised about 30 per cent.

Not an American plow was seen in Mexico is the report given by a tourist who has just returned to this country after traveling 2000 miles through that republic. But great changes are looked for soon. When the National Railroad is completed and opened next November one will be able to reach Mexico from New York in 5½ days. The country is full of energetic English, French and German traders, and some Americans.

The proposed new territory of Oklahoma is described as the new land of promise. Congressman Springer says that within two weeks after the passage of the Oklahoma bill the territory will contain a population of at least 100,000 souls. He says fully that number of people are now metaphorically sitting along the border of Missouri and Kansas awaiting the opportunity to enter.

The Holland American Society of New York, numbering 50 members, on its arrival at Rotterdam, was received by the Mayor and leading merchants accompanied by the Rotterdam National Guard, and at Amsterdam it was escorted by an imposing procession.

Herr Most says there are 1000 outspoken anarchists in New York, and 10,000 or 12,000 sympathizers.

The yellow fever plague in Florida is becoming more serious. In Jacksonville, Fla., the situation is grave. The first case there was that of a man from Plant City, and was pronounced genuine by the physicians July 28. August 9 the presence of the disease caused general alarm, and before the week closed probably 10,000 persons fled from the city, several new cases appearing every day. Saw mills and other manufacturing establishments are closing. Disinfectants are being used broadcast, and huge fires of coal tar and pitch pine are kindled to banish the epidemic. The health authorities at Washington City have ordered officers to proceed to Way Cross, Dupont, Hart's Road Junction, Tallahassee and Chattahoochee, and superintend the fumigation of all mails and baggage coming through these places from the South. Surgeon-General Hamilton thinks this will confine the disease to where it is now, and is confident, in view of precautions already taken, there will be no extended epidemic. At New York all suspected vessels will undergo rigid examination.

Gen. Roger A. Pryor, on behalf of Atty.-Gen. Chas. F. Tabor, has filed in the Supreme Court two suits against the sugar trust, with the design of ending its corporate existence. One of the suits is against the individual members of the trust, who are charged as acting as a corporation without being duly incorporated, and with exercising corporate privileges not granted to them. The court is asked to oust and enjoin them from the exercise of such privileges. The other suit is against the North River Sugar Refining Company,

one of the members of the trust. The complaint recites that this company is a corporation formed under the laws of New York, and then sets forth the steps it has taken in entering into the trust. These acts, it is charged, are in violation of the company's charter and an abuse of its franchise. These are test cases, and if successful similar suits will be brought against the other trusts. Defendants in both suits are given 20 days from August 7 in which to answer. New York and vicinity alone produce daily about 25,000 barrels, and the weekly profits of the trust are estimated at \$750,000 to \$1,250,000, or an annual profit of \$40,000,000 to \$70,000,000.

The great timber raft from Joggins, Nova Scotia, has arrived safely at Erie Basin, and the owners, it has been said, will realize from \$75,000 to \$100,000 on their venture. Mr. Leary, by whom it was built, is expecting to build another of still larger dimensions. The first one contained 13,000 logs, but was abandoned at sea in December last. It was announced at the beginning of its construction that the raft would be a "timber ship." On this ground Mr. Leary obtained in Canada some \$6000 worth of chains to be used in its construction. Otherwise he would have to pay a heavy duty on them to the Canadian Government. The raft was admitted at New York duty free.

The dressed beef rates between New York and Chicago were advanced on August 10 to 25 cents and to Boston 30 cents. Live stock rates were advanced 13½ cents to New York, and other rates now cut will also be advanced. This is supposed to be the end of the much proclaimed dressed beef war. If it has served to check the encroachments of differential rate roads upon the lines that are maintaining schedule rates it will have had a salutary influence.

The adjournment of Congress on account of probable tariff discussion in the Senate now seems further off than ever. Chairman Allison, of the sub-Committee on Finance, having charge of the preparation of the Senate Tariff bill, says some days will yet be devoted to hearings given to different industries, and that there is no prospect of the bill going to the Senate this week. Senators claiming to be well posted on the subject say they will not be surprised if the bill does not come before the Senate for debate until the 1st of September, and are predicting that Congress will not adjourn until some time in October.

A gigantic lumber trust is said to have been formed in Minnesota and Wisconsin, embracing the principal lumber interests of those States, with headquarters at Eau Claire. The company are said to have \$80,000,000 invested in timber lands and to be backed by capitalists in Berlin. The scheme is to float logs over the falls at Minneapolis to large mills to be erected on the Lower Mississippi.

The Convent of the Sacred Heart, at Manhattanville, in this city, was destroyed by fire on Monday night. The loss is estimated at \$400,000. Painters had been engaged during the day gilding the new cross, and roofers had also been at work on the roof, and the fire was most probably kindled by a spark from a neglected charcoal stove. Insurance, \$169,780.

The Siemens Steel Works, at Landore, near Swansea, have been suddenly closed, and thousands of men have been thrown out of work.

The new wheat warehouse of the Northern Pacific Railway, on the seashore of Tacoma, fell into ruins, a number of piles in the foundations having been eaten away by the teredo, and at least 6000 tons of grain fell into the water.

MANUFACTURING

Iron and Steel.

McClure & Schuler, blast furnace engineers and contractors, at Pittsburgh, have closed a contract with the Williamson Iron Company, of Birmingham, Ala., for the erection of three of their Massicks & Crooke's fire-brick, hot-blast stoves of the three pan type, similar to those now in successful operation at the blast furnace of Schoenberger, Speer & Co., at Pittsburgh. They have also contracted with the North Chicago Rolling Mill Company for a plant of three 18 x 65 stoves of the same type, to be erected at one of the company's furnaces at Milwaukee, Wis.

The Nova Scotia Steel Company, with headquarters at New Glasgow, N. S., is about to change its name to the Nova Scotia Steel and Forge Company, Limited, and to increase the capital stock from \$300,000 to \$1,000,000, so as to enable the company to manufacture steel and iron in all its branches and articles consisting of iron or steel in whole or part.

Schoenberger & Co., the well-known iron manufacturers of Pittsburgh, signed the Amalgamated scale last week.

Joseph Corne & Sons, proprietors of the Massillon Rolling Mill, at Massillon, Ohio, signed the Amalgamated scale last week and their plant is now in full operation.

Dover Furnace, of the Penn Iron and Coal Company, at Canal Dover, Ohio, which has been idle for some time undergoing repairs, will resume operations during the present month.

The assignee of the Cartwright Iron Company, of Steubenville, Ohio, who made an assignment in June last, has filed his inventory, appraisal and schedule of liabilities. The assets are \$22,236.38 and the liabilities are \$58,232.39. The Miners' and Mechanics' Bank, of Steubenville, has a mortgage of \$9000 on the premises for purchase money, and there is due the employees \$3411.78. Among the principal creditors are:

Sherrard, Mooney & Co., Steubenville.	\$1,500.00
Allegheny National Bank, Pittsburgh.	2,500.00
Farmers' Deposit National Bank, Pittsburgh.	2,200.00
Spearman Iron Company, Sharpsville, Pa.	1,354.72
Girard Iron Company, Girard, Ohio.	6,859.54
Jefferson Coal and Iron Company, Steubenville.	3,738.94
Shoub & Michaels, Wellsville, Ohio.	4,631.64
Union Scrap Company, Pittsburgh.	6,228.04
J. B. Jones & Bro., Allegheny.	1,101.13
Robinson, Orr & Co., Pittsburgh.	200.94
Youngstown Mining Comp'y, Youngstown.	400.41

The stock on hand will sell for very little more than will pay the costs and the lien of employees, and it is not thought that the plant will bring more than enough to satisfy the mortgage.

The Hubbard Iron Company, of Youngstown, Ohio, whose plant is situated at Hubbard, signed the Amalgamated scale last week, and operations have been resumed. During the shut-down extensive repairs were made to the plant.

On Tuesday, the 7th inst., the Benwood Iron Works, of Wheeling, W. Va., gave orders to prepare the furnace in the forge department for immediate resumption. This department has been shut down since August 16, 1887, or about one year. It will resume operations in full in a few days.

A dispatch from Seattle, W. T., under date of the 11th inst., reads as follows: "A contract was let to-day by the Seattle, Lake Shore and Eastern Railroad to the Moss Bay Iron and Steel Company, of America, for 30,000 tons of steel rails, their delivery to commence next July.

The works of the Moss Bay Company are now in process of construction on Lake Washington, five miles from this city, and will be the largest west of the Mississippi."

The Keystone Rolling Mill Company, Limited, of Pittsburgh, signed the Amalgamated scale last week, and operations have been resumed in full. The company manufacture principally skelp iron, and give employment to about 300 men. This leaves but one firm in Pittsburgh that has not signed the scale, the firm being Dilworth, Porter & Co., Limited.

The Laclede Rolling Mills, of St. Louis, were closed down week before last indefinitely, so far as the lessees of the property, the Laclede Plate and Sheet Mill Company, are concerned. About 250 men are thrown out of employment by the shut-down. It is stated that there is a possibility that the plant will resume operations in the course of a few months. Two schemes are said to be on foot, by either of which the works could be operated under lease.

The report published in the Pittsburgh papers last week to the effect that the men of the Pittsburgh Tube Company, in that city, which have been idle for some months, were about to resume operations is without foundation. The works will remain idle until there is an improvement in the pipe market.

During the hot weather shut-down the Granite Iron Rolling Mills, of the St. Louis Stamping Company, St. Louis, are undergoing very thorough repairs. Three furnaces are being rebuilt, others overhauled, and the boilers and their foundations and gas connections are being looked after."

The Union Iron Mills, of Carnegie Brothers & Co., Limited, at Pittsburgh, have been closed down for a period of two months. The guide mill and bar mill will continue to run part of the time. The cause of the shut-down is to put in a new foundation of concrete and stone to take the place of the present one, which has crumbled away until it has become unsafe. A number of other repairs will be made.

Allderdice, Bishop & Co., of Warren, Ohio, who operated the Warren Rolling Mill a part of last year, have signed the Amalgamated scale. The plant is now under the control of Henry Wick, formerly of Youngstown, Ohio, who will operate it. The works contain 16 puddling furnaces, four heating furnaces and two trains of rolls. Operations will be resumed during the present week.

W. J. Hammond & Sons, Limited, proprietors of the Pennsylvania Iron and Steel Works, at Pittsburgh, signed the Amalgamated scale on Friday, the 10th inst. As their works have been idle for some months, the signing of the scale has been taken as an indication that operations will be resumed at an early day.

Thomas Furnace, of the Thomas Furnace Company, at Niles, Ohio, which has been idle for some time undergoing repairs, has again resumed blast. During the stoppage the furnace was relined and otherwise repaired.

The old crucible steel works at the side of the C. and P. track between Euclid and Woodland avenues, Cleveland, which had been leased for a term of years by Cleveland parties, repairs being nearly completed, was damaged by fire. The works contained a 9-inch train of rolls, two finishing heating furnaces, scrap furnace, hammer, and other facilities for the manufacture of merchant iron.

The employees of the Bellefonte Iron and Nail Company, of Bellefonte, Pa., are out on a strike on account of a reduction in wages proposed by the firm. Under date of the 6th inst. the firm write us as

follows in regard to the matter: "On July 1 we reduced our heaters 11 cents per ton, which reduction they declined to accept, and have been idle since that time. There was no reduction of our furnace wages or any question about the wages we were paying our firemen. On Monday, July 30, all our puddlers and helpers quit work, the cause of which we are unable to state, as there was no question of wages or any differences between us on the wage question. Our furnaces, rolling mill and factory will resume operations in a few days."

The Chicago Forge and Bolt Company have secured part of the contract for the Ashland avenue viaduct in Chicago. They have also successfully competed for heavy orders for bolts for the Ohio and Mississippi Railroad and for the new West Side Chicago cable road. It is understood that the residue of this cable contract was placed with Cincinnati manufacturers. The price agreed upon was \$38 a section, delivered in Chicago. This covers yokes, tubes, manhole-plates, &c., but not slot and tram rails. A section covers nearly a ton of material.

The Joliet Steel Company's new rod mill, at Joliet, Ill., built under the supervision of William Garrett, has recently been put in operation, and we are informed has started off better than any former mill of the kind. A material point of difference in operating this mill as compared with others in existence is that all the trains of rolls are driven from one massive engine, connected with large pulleys and very wide leather belts. The mill is roomy, airy, and fitted up to give the men every opportunity to make a large output without being overcrowded. It is too soon to say what the capacity of the mill will be, but it is understood that it will be no less than the best rate of production of any modern mill of the kind.

The North Chicago Rolling Mill Company have blown in two more blast furnaces at South Chicago, making three in operation and leaving one idle in that plant. These furnaces were started up to make Bessemer pig iron for another company and not because the demand for steel-rails had made a greater production of iron necessary to supply their own wants.

The announcement is made of the sale of the entire property of the Sheffield Land, Iron and Coal Company, Sheffield, Ala., for \$1,750,000 or \$2,000,000. The purchasers are mainly Eastern capitalists. Of the price paid \$750,000 or \$1,000,000 is to be in cash. The sale must be ratified by the stockholders. There is no likelihood of any hitch. In addition to the sum to be paid for the property the purchasers agree to invest about \$1,000,000 in new enterprises.

Col. S. F. Scott and C. P. Deatherage have purchased a two-thirds interest in the machinery of the Harrison Wire Works, St. Louis, and will move to Kansas City at once. The citizens of Kansas City have donated the grounds, valued at \$15,000, and have taken stock to the amount of \$25,000 for the purpose of building a large mill for manufacturing merchant iron, including wire of every description. Mr. James C. Anderson, of Chicago, who held a third interest in the old wire works, will retain his interest and manage the concern. A stock company was formed, with a capital of \$100,000, to operate the works. The purchase does not include any of the realty controlled by the Harrison Iron Works.

It is now practically settled that the St. Louis mill will resume on or about September 15. The work of rebuilding the burned portions of the Jupiter Furnace was to have commenced, but was deferred.

The Western Steel Company have surrendered possession. The work of stacking ore ready for commencement has begun, and train loads are being piled in and about the yards.

Machinery.

The contract for furnishing and placing 300 miles of wire for the police and fire-alarm telegraphs of New York City in the conduit put down by the Electric Subway Company has virtually been awarded to the Standard Underground Cable Company, of Pittsburgh.

Messrs. Stearns, Rogers & Co. have purchased the plant of the former Colorado Machinery Company, Pueblo, Col., and will commence work upon a big order for machinery for the Philadelphia Smelting Company as soon as the plant can be got in order. This fall the plant is to be enlarged and a new and extensive building erected.

The Scott Foundry Department of the Reading Iron Works, at Reading, Pa., have made the first shipment (five carloads) of the Pioneer Cotton Press, for the Pioneer Compress and Warehouse Company, at Brunswick, Ga. The shipment consisted of the whole boiler plant complete, with the links and cross-head of the cotton press, the latter casting alone weighing over 23½ tons.

John Mohr & Son, whose boiler works are located at 32 to 42 Illinois street, Chicago, have secured the contract for the boilers of the great Auditorium building in that city. There are to be 13 boilers in all, each 66 inches in diameter and 18 feet long. They will be built of Otis steel, furnished by Joseph T. Ryerson & Son.

John Duncan's foundry and machine shops in Fort Howard, Wisconsin, were burned on Sunday. Loss, \$40,000; insurance, \$10,000.

At a meeting of the board of directors of the Westinghouse Electric Company, of Pittsburgh, held in that city on the afternoon of the 11th inst., a dividend of 1½ per cent. out of the earnings of the last quarter was declared. The stock is selling at about one-half its par value, which makes the dividend equivalent to 12 per cent. per annum.

The Westinghouse Air Brake Company, of Pittsburgh, have awarded the contract for the foundation work of their proposed works at Wilmerding Station, on the Pennsylvania Railroad, near Walls Station, and the contractors will soon begin work. Among the structures to be built are the machine shop, which is to be 500 x 250 feet; the foundry, 500 x 300 feet; the boiler-house, 160 x 80 feet, and the blacksmith shop, 250 x 150 feet. It is estimated that the cost of the plant will reach nearly \$1,000,000.

On Saturday Manning, Maxwell & Moore, of New York, shipped from the Pond Machine Tool Works 117 tons of finished machine tools to various railroads throughout the country, from Massachusetts to Kansas, and as evidence that their shop is in full operation they would state that they made the castings in the foundry, finished in the machine shop, and shipped last month the following tools: One 42, one 36, one 38 and one 30-inch special heavy lathe; one 40-inch planer, with two heads on the cross-rail and two on the uprights, 60-foot bed for the Chicago, Rock Island and Pacific shops, at Horton, Kan.; one 36, one 32 and one 22-inch planer; an 84-inch boring mill, with two heads on the cross-rail; a 72-inch boring mill, a 60-inch radial drill, a 32-inch upright drill and several punches and shears and chucks. They made also one of the large steel-tire turning lathes, for turning steel-tired wheels on their axes,

weighing some 47,000 pounds, which they shipped to the Horton shops of the Chicago, Rock Island and Pacific. They are now working their 400 men, and are prepared to fill orders for all kinds of their standard tools promptly, as they have complete parts for nearly the entire list of their tools.

Hardware.

The property of the United States Stamping Company, of Portland, Conn., was sold at public auction to satisfy court judgments and mortgages. Myer Hellman, of New York, bid off the real estate for \$11,500 and the machinery and personal property for \$16,100—making a total of \$27,600. The price is considered cheap for the property. It is thought that Hellman bid off the property for a new company.

Miscellaneous.

Licenses of incorporation have recently been issued by the Secretary of State of Illinois, as follows: The Conley Iron and Steel Company, Chicago; capital, \$1,750,000; incorporators, Arnold Brecher, Laing Leland, J. Howland Silveira and Sumner Stowe. The Chicago Cold Bending and Coiling Pipe Company, Chicago; capital, \$150,000; incorporators, George W. M. Reed, George H. Bozet and Earl B. Smith. A certificate was filed recording the increase of the capital stock of the Garden City Steel Company at Chicago to \$10,000.

The street pavement of steel bars mentioned in these columns some months since as having been laid in Chicago has proved unsatisfactory, and the company by whom it was put down have been ordered by the city to replace it with granite blocks.

From the Marquette, Mich., *Mining Journal*, of the 11th inst., we take the following: For the week ending with Wednesday, the 8th, the lake shipments of iron ore from the mines of the Lake Superior region amounted to 165,533 gross tons, of which 21,795 tons went from Marquette, 45,575 tons from St. Ignace, 73,839 tons from Escanaba, 21,795 tons from Ashland, Wis., and 13,845 tons from Two Harbors, Minn. This makes the aggregate for the season to date 2,031,897 tons, this being 251,478 tons less than the quantity that had been sent to market by lake at the corresponding date last year. The shipments by range are as follows: Marquette range, 788,066 tons; Gogebic range, 592,350 tons; Menominee range, 495,986 tons; Vermillion range, 155,495 tons.

Port.	1888.	1887.	1886.
Marquette.....	305,042	438,782	485,495
Escanaba.....	1,024,142	1,083,363	790,903
St. Ignace.....	63,457	47,682	36,907
Ashland, Wis....	483,761	541,500	335,553
Two Harbors, Minn.....	155,495	171,775	156,346
Total.....	2,031,897	2,283,370	1,804,203

The Ohio Falls Car Company, Jeffersonville, Ind., have taken an order for 200 gondola coal cars from the Louisville and Nashville Railroad, which, besides the other freight work, will keep them busy until October. For several months they have been busy on passenger work, avoiding the low prices bidding on freight contracts. The restarting of the freight department will give regular employment to several hundred hands, who were laid off or occupied in other ways. The company have made extensive improvements during the interim, some being a complete saw-mill added to the plant and the building of large shops for the erection of freight cars.

The Aluminum Brass and Bronze Company, of Waterbury, have purchased a tract of land in Bridgeport, Conn., and will begin at once to erect brick buildings covering 65,000 square feet of ground for their works. The company will have a capital stock of \$250,000 paid in, and will soon establish a large plant.

The Iron Age

New York, Thursday, August 16, 1888.

DAVID WILLIAMS, - - - PUBLISHER AND PROPRIETOR.
CHAS. KIRCHHOFF, JR., - - EDITOR.
GEO. W. COPE, - - - ASSOCIATE EDITOR, CHICAGO.
RICHARD R. WILLIAMS, - - - HARDWARE EDITOR.
JOHN S. KING, - - - BUSINESS MANAGER.

The Iron Age Index.

A complete Index for Volume XLI, January to June, 1888, is now ready. Subscribers desiring to have a copy should apply early, as only a limited number have been printed.

Tributary Traffic.

A question of importance in transportation has lately been brought to public attention. In brief, it is this: Has a trade center a legitimate claim upon the traffic which may be tributary to it, and if so, in what does it consist and how far may it demand favoring rates of freight? Not long since the merchants of Kansas City appealed to the railroads running through Kansas and through the East to arrange rates on Kansas corn and other products so that they might buy it, bring it to Kansas City, and resell at Chicago or at the seaboard. As the tariffs then stood this was doubtful, because the through rate to Eastern points from place of growth was lower than the local rate to Kansas City and the through rate from thence. A recent meeting of railroad managers was held to consider the appeal, but without result thus far. If the railroads raise the through rate it must necessarily hurt the grower, and in the long run the carrier too; and yet the Kansas local rates cannot be reduced without cutting down such railroad revenue as may be considered necessary for reasonable profit, and which on local business is not unfair.

The same discrimination is complained of by Chicago. Instances are cited where grain from Iowa and Nebraska has been carried to New York at through rates which are less than the sum of the rates to Chicago and then to New York. The Interstate Commission has lately been taking testimony upon a somewhat similar complaint at Detroit. The tariff between Detroit and New York is 78 per cent. of the Chicago-New York rate, while the proportion of the roads East of Detroit on Chicago traffic to and from New York is but 70 per cent. of that through rate. The defense of the railroads is that these facts have no real relation to each other; that the Detroit-New York rate is reasonable in itself and cannot be judged by any proportion of a through rate to any other city; that strict mileage proportion in making tariffs is out of the question, because, as all acknowledge, terminal expenses are not reduced as distance is shortened, and hence the shorter the haul the greater the proportional cost. It must be acknowledged, however, that this state of things has one bad result; it destroys the possibility of the gathering in of a large traffic which shall be tributary to that city from a wide extent of country, for the

through rates to and from villages, with higher local rates for local trade, will tend to free those villages from dependence upon any near-by city.

The Interstate Commission are already on record upon this point. When Omaha complained that the rates from Chicago to Lincoln were lower than the two rates each side of Omaha added together the Commission declined to condemn the tariff. Omaha, they said, could not ask to control Nebraska business to the detriment of the rest of the State. The reasoning would seem to be sound. Why should any city, whether on the seaboard, on the lakes, or on the rivers, continue to monopolize the trade of large sections of our country through unduly favoring freight rates, to the disadvantage of a large portion of our people? It is of great importance to a healthy growth in prosperity of any State that its products of the soil or of manufacture should reach consumers at the least possible expense of time or money, and that return commodities should in like manner be transported to them from points of origin. If we admit that particular trade belongs of right to particular places we endanger this other right to general prosperity. It is a fact, too, that cities generally do not need special transportation favors to secure and retain a fair trade. The advantages of neighborhood are of themselves decidedly great. Quick delivery of goods sold and quick returns for produce consigned, a more intimate friendship between buyer and seller than is possible when these are widely separated, these and other points will be readily appreciated, and small disadvantages in freight rates are not enough to overcome them.

It is possible that we may shortly see modifications in our geographical arrangement of rates. Heretofore a prominent place like Chicago has been the basal point of the system, and the rates to and from other places have been made in proportion. But such a system, while orderly and readily understood, has its disadvantages. New York, Chicago, Kansas City, Detroit are basal points, because they are natural trade centers. It may be argued, therefore, that they really do not need rate favors. Another reason for their position as basal points is that there is a necessity for some stopping points in tariffs. But such a system does not always admit of the lowest possible rate—say, on grain—from the wheat fields to the consumer, who possibly may be located in Europe; for under this supposed railroad necessity for a basal point this grain may be compelled to pay tribute to some railroad competing point not on the direct line to destination. If we acknowledge any authority in European precedents, such a round-about journey, if it exceed the straight line by more than 25 per cent. of distance, is a wrong to the direct line and to the shipper, if his possible gains be lessened by this really needless adherence to a geographical system. It is probable that from these complaints of discrimination on the part of the cities we have named will arise decisions by the Interstate Commerce Commission, by our railroad managers and by public opinion, leading to the opinion that no particular section or cities have any inherent right to any particular trade, and that the first principle is the cheapest possible carriage between producer and consumer, without regard to geographical position of other intermediate towns.

The Blast Furnaces on August 1.

During July quite a number of furnaces blew in, the majority of them classing among the larger producers, so that on the whole the tendency is again toward a slightly increased product. The reports from a number of plants now idle, which contemplate an early resumption, lead to the conclusion that this tendency has not yet spent its force, though it must not be forgotten that it is natural to report the prospect of early blowing in, while few furnace managers, often hoping against hope to carry their stacks through serious trouble, are willing to admit that they may soon be forced to go on the list of temporarily idle plants.

In detail, the position of the anthracite furnaces was as follows:

Anthracite Furnaces in Blast August 1.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New York.....	28	10	2,983	18	3,985
New Jersey.....	15	4	1,297	11	3,498
Spiegel.....	3	2	148	1	67
Pennsylvania:					
Lehigh Valley.....	46	27	9,947	19	4,371
Spiegel.....	1	1	50	0	0
Schuylkill Valley.....	36	16	5,314	20	4,055
L. Susquehanna Valley.....	23	11	4,304	12	2,852
Lebanon Valley.....	15	14	6,751	1	400
U. Susquehanna Valley.....	18	8	2,603	10	1,881
Maryland.....	4	0	0	4	482
Total.....	187	93	33,397	94	21,571

As will be observed from the following comparison, August opened with a slightly increased capacity at works, though of course considerably below that of last year:

	Furnaces in blast.	Capacity per week.
August 1, 1888.....	93	33,397
July 1.....	92	32,478
June 1.....	96	32,418
May 1.....	94	31,006
April 1.....	94	30,486
March 1.....	96	28,586
February 1.....	97	29,959
January 1.....	118	38,206
December 1, 1887.....	122	39,487
November 1.....	124	40,028
October 1.....	123	39,440
September 1.....	125	38,338
August 1.....	129	37,930
July 1.....	138	40,742

In New York the principal events during July were the blowing in of the Kirkland furnace, on the 17th, and the stoppage of the second Onondaga on the 14th. In New Jersey only four furnaces were in operation, Chester remaining banked. The second of the spiegeleisen furnaces of the New Jersey Zinc and Iron Company was, however, blown in on the 2d of this month. In the Schuylkill Valley Mount Laurel is now idle, and Norway was forced to go out for relining on the 26th ult., with the possibility of resuming in the beginning of October. Topton, too, was not running at the beginning of the month. In the Lehigh Valley Crane is running all its five furnaces. Bethlehem is producing with six, the Thomas Company with ten, and Glendon one. Durham, which was out of blast since January 21, ran during the greater part of July. Returns of the production of every furnace, with the exception of a single one, make the aggregate July product 44,052 gross tons. The growing use of Lake ore at the leading works is running up the product.

In the Lower Susquehanna Valley, the only change brought about is the blowing in of the second Chickies furnace. The Lebanon Valley continues its exceptional

position of being that producing section in which by far the greatest percentage of the capacity is actively engaged. Returns from all but one furnace company show a total production of 30,000 gross tons in July. In the Upper Susquehanna district the same plants are running, their aggregate July product from official reports being 11,529 gross tons.

The position of the coke furnaces was as follows on the 1st inst.:

Bituminous and Coke Furnaces in Blast August 1

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New York.....	3	1	984	2	1,900
Pennsylvania.....	19	15	15,953	4	2,960
Pittsburgh district.....	1	1	311	0	0
Spiegel.....	20	11	6,511	9	4,676
Shenango Valley.....	21	12	6,023	9	3,320
Juniata and Conemaugh.....	1	0	0	1	200
Spiegel.....	5	3	1,252	2	976
Youghl. Valley.....	3	1	614	2	945
Miscellaneous.....	2	1	200	1	120
Maryland.....	11	7	3,625	4	2,115
Virginia.....	6	1	746	5	2,048
West Virginia.....	4	4	1,058	0	0
Kentucky.....	13	10	7,516	3	2,028
Ohio.....	11	8	1,945	3	548
Mahoning Valley.....	14	4	1,189	10	2,128
Hocking Valley.....	17	9	6,939	8	3,578
Central and Northern.....	15	7	7,637	8	7,118
Illinois.....	8	1	418	7	3,350
Missouri.....	4	2	900	2	1,252
Wisconsin.....	2	1	174	1	240
Indiana.....	1	0	0	1	250
Michigan.....	19	13	6,470	6	3,481
Alabama.....	10	8	3,402	2	947
Tennessee.....	2	1	546	1	259
Georgia.....	1	1	462	0	0
Colorado.....					
Total.....	213	122	74,865	91	44,327

The coke furnaces have therefore recovered to their May and June work, as the following comparison will show:

	No. of furnaces.	Capacity per week.
August 1, 1888.....	122	74,865
July 1.....	121	69,543
June 1.....	128	75,427
May 1.....	130	75,815
April 1.....	128	70,644
March 1.....	128	68,892
February 1.....	136	73,912
January 1, 1888.....	143	83,101
December 1, 1887.....	144	88,835
November 1.....	151	90,459
October 1.....	152	89,123
September 1.....	145	83,124
August 1.....	113	62,001

In the Pittsburgh district Isabella No. 1, which has been idle for several months for repairs, blew in early this month; Edith, which went out on April 5, is to be ready on about September 15, and Soho, of the Moorhead-McCleane Company, may be at work toward the close of next month. On the other hand, Lucy No. 1, of Carnegie Brothers & Co., Limited, is expected to go out for repairs during the current month. On the whole, therefore, an increasing product is expected. In the Shenango Valley Ella is out for repairs, but on the other hand Etna started again on the 26th ult. Neshannock did not come up to its usual product in July, being stopped for two weeks to put in a new 18 x 60 Whitwell hot-blast stove, making the fourth of that plant. One of the Stewart furnaces was blown out in July. In the Juniata and Conemaugh valleys 12 furnaces made last month 26,674 tons of pig iron, an unusually large output. Among the furnaces grouped under "Miscellaneous" in Pennsylvania, it may be noted that Center was to begin blowing again early this month.

In Maryland Catocin, under new management, resumed late in July. In Virginia there have been no changes.

During the month Lynchburg is again to be added to the active stacks. In West Virginia Belmont was still the only plant producing on the 1st inst., but since then Irondale has resumed. In Kentucky all the four furnaces are running, Ashland making American Scotch foundry iron.

In the Mahoning Valley production is again on the increase. During July Anna resumed on the 20th ult., Mary on the 26th and Thomas on the 1st inst. Falcon was still banked early in the month. The July product was 23,429 tons, but the furnaces are now producing at the rate of 7516 tons a week, or close to 32,000 tons a month. An increase has also taken place among the furnaces in Central and Northern Ohio. The Cleveland Rolling Mill Company are running three furnaces, Zanesville is again producing, and Benwood was to blow in early this month, and one of the Graffton furnaces, leased by McKeefrey & Hofins, is having a new bosh put in, which was completed yesterday. Emma went out for repairs on the 27th ult., while Franklin was banked during the whole of July. In the Hocking Valley the only item of news is that Crafts is to resume this month. In Illinois Calumet stopped for repairs, which, it is expected, will be completed by October 1, but, on the other hand, the South Chicago plant is doing more, so that the capacity blowing is greater, though the number of furnaces was the same. In Missouri only one stack is at work. In Wisconsin the second Bay View is now idle, too, but, on the other hand, Minerva and Mayville are at work.

In Alabama Sheffield was banked on the 24th ult., but one of the Sloss furnaces went in on the 11th. The first stack of the Sheffield and Birmingham Company is to be blown on the 17th. Both Alice, two Ensley, two Eurekas and one Woodward are at work. In Tennessee Sewanee is out, and one South Pittsburg furnace is idle. In Georgia Cherokee went out of blast for want of coke and to make repairs. The position of the charcoal furnaces was as follows:

Charcoal Furnaces in Blast August 1.

Location of furnaces.	Total number of furnaces.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New England.....	14	7	510	7	580
New York.....	10	4	490	6	475
Pennsylvania.....	23	3	265	20	810
Maryland.....	13	2	251	11	670
Virginia.....	23	5	198	18	750
West Virginia.....	3	0	0	3	165
Ohio.....	18	8	582	10	673
Kentucky.....	3	2	190	1	80
North Carolina.....	2	1	90	1	80
Tennessee.....	10	5	1,220	5	1,130
Georgia.....	2	0	0	2	114
Alabama.....	10	8	1,520	2	375
Michigan.....	25	12	3,597	13	2,305
Minnesota.....	1	0	0	1	130
Missouri.....	4	2	623	2	320
Wisconsin.....	11	4	817	7	1,070
Texas.....	1	0	0	1	178
California.....	1	0	0	1	230
Washington Ter.....	1	1	330	0	0
Oregon.....	1	1	270	0	0
Total.....	176	65	11,137	111	10,065

There have been few changes in the status of the charcoal furnaces. In Maryland Muirkirk was stopped by a fire. In Virginia the same furnaces are at work, to which Walton is soon to be added. In Kentucky both Bellefonte and Hunnewell are producing and Estill is to come in at an early date. In Ohio Vesuvius has

stopped to put in a new hearth and bosh, while in Michigan Spring Lake is preparing to go in, if indeed it has not resumed at this time. In Wisconsin Hinkle is expected to blow in September 15th. In Tennessee Bear Spring went into blast on the 24th ult., and Speedwell was expected to blow again on the 15th of this month. In Alabama both the Woodstocks are out, No. 2 having stopped on the 1st inst. for repairs.

The Position of Tin Plates.

The reduced stocks of tin plates on this side, approaching downright exhaustion in some grades, in spite of the largely increased importation, lead to the conclusion that our consumption of the article is greater at present than it has been at any previous time, and that with our fine fruit and cereal crops and the comparative cheapness of provisions and petroleum the tin plate trade will continue to flourish during the coming fall season. This expectation is heightened by the promise of an unusually heavy export of merchandise in general, and of canned goods in particular, to the Antilles, South and Central America. Since the rise in coffee and sugar planters are again flourishing, the result being an enlarged consumption of all sorts of canned goods.

Our import of tin plates for the 11 months of the fiscal year, which ended June 30 last, was 12 per cent. greater than during the corresponding period of 1887, for it amounted net to 255,628 tons of 2240 pounds, against 228,270 tons during the preceding 11 months, yet the stocks in the seaports and the interior have reached a low ebb, proving that the absorption has run ahead of the unprecedented supply.

We have before us the circular of Messrs. Henry Nash & Co., Liverpool, from which we extract a few figures relating to the export thence of tin plates to American ports during the first six months of 1888 and 1887. They were as follows, in boxes:

English Exports of Tin Plates to American Ports.

Port.	1887.	1888.
New York.....	501,414	222,366
Philadelphia.....	161,297	222,327
Boston.....	109,041	114,022
Baltimore.....	115,124	127,973
San Francisco.....	79,307	68,078
New Orleans.....	28,272	40,174
Portland, Me.....	53,156	19,409
Portland, Ore.....	8,524	4,213
Other ports.....	47,657	18,398
Totals.....	1,101,792	964,967

The falling off to New York will be noticed.

The Board of Trade returns for tin plates for the first six months were as under:

	1886.	1887.	1888.
	Tons.	Tons.	Tons.
To France.....	2,343	8,106	2,449
the United States.....	143,383	126,310	140,424
Canada.....	5,643	8,472	8,996
Australia.....	1,879	3,081	4,384
Other countries.....	23,741	26,219	31,976
Totals.....	151,994	176,188	188,179

The increased takings by Canada and Australia will be observed.

The most surprising thing is to find out how very well sold most of the makers are. Some few of them make it a rule never to sell forward to any large extent, but the great majority of them say they cannot deliver plates before September, some say October, and even all the year has been named by others. The volume of exports keeps up; the total shipments

to all ports are about 240,000 boxes in excess of last year. The stocks in shipping ports have been decreased during the month 15,000 boxes.

Considering the numerous fluctuations in pig tin since October last, makers have steered their way well enough, and the comparative steadiness in the price of plates at Liverpool has evidently been instrumental in giving an impulse to exports; if prices had fluctuated largely through speculative influences or a wavering disposition on the part of makers, exports would not unlikely have diminished, instead of following its even course undisturbed. It is to be hoped that a similar conservative spirit may characterize the remainder of the year and steady the confidence in the future of the article.

The economic handling of material in carrying out engineering work of any magnitude is deservedly a matter of much interest, and the novel expedients which now and then suggest themselves under special conditions are well worth recording. We have been tempted to refer to this subject more particularly by the recent publication of an account of some of the methods adopted in sinking the caissons for the Forth Bridge. A specially designed hydraulic shovel was used in digging through a stratum of very tough boulder clay, and some means had to be provided for getting rid of the water which the apparatus exhausted, and which accumulated in the caisson. To avoid distressing the men the air pressure in the caisson, after the latter was made tight against the entrance of water around it by sinking the edges into the clay, was allowed to fall to a point much below the hydrostatic pressure due to the head of water above it. It became doubtful whether with an atmosphere relatively so attenuated the pumps employed would lift the waste water through the 60 or more feet necessary to reach the surface, and the question was therefore solved by the simple expedient of setting the suction-pipe so as to draw in air with the water. In passing through the valves together, the air and water were churned into a sort of emulsion, lighter than water alone, and a discharge of this was easily maintained from the upper end of the delivery-pipe, without resorting to force-pumps or air-chambers. While we are not aware of any previous instance where the lift amounted to as much as 60 or 80 feet, the notion of taking advantage of the reduced weight of a mixture of water and air, as compared with that of water, is not so very new, but has, we think, been applied on many occasions in raising water through heights ranging from about 28 to 86 feet. The account, however, recalls the method which, we believe, was adopted a number of years ago in the Hudson River Tunnel in removing from the heading the material of excavation. This, which was soft mud, was thinned by the admixture of water, and in this state was forced by the air pressure in the heading through a line of pipes leading from a trough to a suitable place for deposit on the surface. The length of the pipe line, as we remember it, was considerable, without, however, giving rise to any difficulty, and the simplicity and convenience of the method were striking. No machinery

was necessary, as pipes simply were laid down and a slight additional tax was put on the air compressors, which were in regular use for supplying the headings. But the novelty of this arrangement also may be questioned, since in some localities in the manufacture of earthenware the clay, in a properly prepared state, is conveyed through pipes over short distances in a similar manner, illustrating the advantages of the system, though somewhat modified, on a relatively smaller scale. The peculiar value of the methods under certain conditions, however, makes them generally interesting.

The steel rail situation in the West is becoming a matter of anxiety to others besides the steel rail manufacturers. As long as orders for steel rails were abundant the manufacturers of other forms of iron and steel competed with one another on fairly equal terms for business, and often enjoyed an overflow from the rail mills of work which the capacity of some part of their plant was not equal to. The rail mills were then very far from being a disturbing element in the general situation, except that they formed an important factor in making the price of ore and coke high by consuming such enormous quantities of these materials, and thus indirectly but unintentionally making such materials high-priced for other iron and steel manufacturers. Now, however, the situation is changed, and the makers of iron and steel for the general market have good reason to feel apprehensive of competition for business in many lines from the great Bessemer steel works. They have blast furnaces of the most modern type, employ accomplished chemists, have able managers, and are prepared to make pig iron of nearly any quality desired. A number of them have rolling mills for turning out other products than rails, and can speedily enter the field with mild bar steel to take the place of iron or to supplant the higher priced bar steel made by mills purchasing the blooms or billets. The Joliet Steel Company have already embarked in the manufacture of wire rods to secure an outlet for part of their product, and the North Chicago Rolling Mill Company are contemplating the erection of works to enable them to produce a heavy output of other forms of steel than rails, but there will still be a surplus capacity in the Western steel works for the production of steel for the general market if the demand for rails does not improve. The entire substitution of steel for iron has often been prophesied, and the fulfillment of the prophecy has been as often deferred, but every such period of dullness in the rail trade as that now existing brings the inevitable day nearer when steel will crowd rolled iron to the wall.

During the past few weeks our market reports from every section of the country have reflected the healthier tone which has at last given way to the long continued decline. Buyers after having long kept within the bounds of early requirements have at last purchased liberally for delivery into the future. Month after month the patience of sellers was sorely tried by the absence of round orders. Again and again the claim that bottom had been reached was disproved by the announce-

ment of lower prices. Sellers from distant points, unheard of in local markets, pressed material with all the vigor, and all the indifference to price, which characterizes those who are seeking a footing in new territory. The tide has at last turned. It is rising slowly, almost imperceptibly. No one expects a sudden increase in values, and the position of business generally throughout the country is still too dependent upon crop developments to admit of the statement that a set-back is impossible. A discouraging feature, too, which of course has its indirect effect upon all departments of the iron trade, is the steady decline in steel rails, which have sold at \$29 at tidewater and at \$30 at Chicago. But in all the other lines which go to making up the greater part of the business in which the readers of *The Iron Age* are interested it has been clearly shown that restricted buying has made the current consumption appear really smaller than it was. When there is an end to the present uncertainty as to the crops, with its exaggerated misstatements made on both sides by interested speculators, then it will become clear what the tendency is to be. A great gain has already been made in putting the markets into a sounder and more hopeful position.

The lightning rod has endured more ridicule than usually falls to the lot of a novel appliance whose value cannot be incontestably proved. This is partly owing to the poor quality of the earlier rods, and partly to the peculiar methods of the lightning-rod men themselves, who in the past have sold their goods in the country districts by the assistance of the most extravagant stories. Unwarranted and ridiculous claims have had much to do with the disrepute into which the lightning-rod has fallen among the uneducated. Intelligent people, however, who have not been misled by ignorant report, are almost unanimous in considering it an important factor of safety. So general is this reasonable faith that it is astonishing to read in a journal devoted exclusively to electrical matters, that "the uselessness of the lightning-rod is becoming so generally understood that the agents find their vocation a trying one. Fewer and fewer rods are manufactured each year, and the day will come when a lightning-rod on a house will be regarded in the same light as a horseshoe over a man's door." We are not in possession of statistics of the lightning-rod industry, so cannot admit or dispute the statement that the manufacture of lightning-rods is decreasing. Estimated in lineal feet, we would not be surprised if the production had fallen off, but this is no fair criterion. Some years ago large quantities of small iron lightning-rods were sold, and were fitted and put up in the cheapest possible manner. Such conductors, when new, were of little, if any, use, and after a short time, when the points became rusty and the joints broken, were utterly and altogether valueless. It is not fair, therefore, to condemn the system because so faultily exemplified. It is quite likely that the wretched imitations of lightning-rods are made less than heretofore, but, on the other hand, rods well constructed and fitted are increasingly popular. A well-made copper rod with gilded points and ample groundings cannot be had for a six-

pence, and the owners of houses of moderate cost would rather brave the uncertain thunderbolt than meet a certain expense. The fact that cheap and inefficient rods are less popular than formerly is no argument that the principle of protection by lightning conductors is scientifically unsound.

CORRESPONDENCE.

The Life of Iron Roofs.

MARSHALLTON, DEL., AUGUST 14, 1888.

To the Editor: Noticing in *The Iron Age* of the 9th inst. an article "The Life of an Iron Roof," I would state that my barn is covered with an iron roof which was put on in 1846. This roof is the ordinary standing groove, and, beyond painting every three or four years and some slight repairs caused by the blizzard last March, has cost nothing since it was put on. We have a house in Wilmington that has a similar roof, put on in 1850, and, except an occasional painting, has cost nothing for repairs. An adjoining tin roof of about same size, put on at same time as the iron roof, has required as much painting as the iron roof, and cost over \$100 additional on repairs. Both the iron roofs above mentioned are in perfect condition to-day. Very respectfully

J. R. BRINGHURST.

The autumn meeting of the Iron and Steel Institute is to be held at Edinburgh on the 20th, 21st, 22d and 23d of August. The following papers will be presented: "On Testing Machines," Daniel Adamson, president; "On Manganese Steel," R. A. Hadfield, Sheffield; "On the Metallurgical Exhibits at the Glasgow Exhibition," W. J. Millar, C. E., Glasgow; "On the Mineral Resources of Eastern Scotland," H. H. Howell, director of the Geological Survey of Scotland, Edinburgh; "On the Forth Bridge," F. E. Cooper, M. I. C. E., resident engineer; "On the Testing of Materials of Construction in the United States," George H. Clapp, Pittsburgh; "On the Chemical Processes Involved in the Rusting of Iron," Professor Crum-Brown, F.R.S.S.L. and E., Edinburgh; and "On a New Form of Pyrometer," Professor Wiborgh, Stockholm.

Sulzer & Vogt, proprietors of the Louisville Machine and Elevator Works, Louisville, Ky., finding that their shops are inadequate for present requirements, have purchased a large lot on the corner of Main and Preston streets, running through to Washington street, and are now erecting a building for machinery shops 50 x 200 feet, four stories high. The foundry will be 45 x 200 feet, the blacksmith shop 30 x 60 feet, and the warerooms 40 x 200 feet. Across Washington street they are building boiler yards and sheet-iron works 105 x 200 feet. The two specialties manufactured by Sulzer & Vogt are ice machines and elevators, both of which are widely used through several States. The firm have been working under disadvantages for some time, as the old buildings now used are some distance apart, requiring extra supervision in the various works. It is a bold venture on the part of this enterprising firm, who are uniting the several lines of business on so large a scale, and it will be watched with interest, but as the present move is the result of success in the past it will not be surprising to see them continue to prosper.

During the first six months of the current year the Boston and Montana Copper Company produced at their Butte works 14,866,750 pounds of matte, containing 8,815,484 pounds of fine copper. The product of June was 1,775,000 pounds fine.

OBITUARY.

John Featherstone.

Intelligence has been received from Dresden, Germany, of the sudden death at that place of John Featherstone, of Chicago, proprietor of one of the largest iron foundries in the Northwest. Mr. Featherstone had been in poor health for a year or more, and about a month since left Chicago for the East and for Europe, arriving at Dresden but a short time before his death, which occurred on the 9th inst. He was born in Schenectady, N. Y., in 1834, and was therefore but 54 years old when he died. He was of English parentage, his father having removed to America from Exeter, England, a few years before his birth. The untimely death of his father threw the support of the family upon John, who was the oldest son, and who had just learned the trade of a molder. He was equal to the situation, and demonstrated, while yet but a boy, the possession of those qualities which made him such a successful business man later in life. He removed to Chicago in 1866, and entered the service of the Chicago and Northwestern Railroad Company, remaining until he attained the foremanship of their brass foundry. Soon after, about 1870, he concluded to engage in business upon his own account, and started a small foundry at North Halstead and Front streets on the site now occupied by the large works into which his modest venture steadily grew. He has been in late years ably assisted by his sons, who will doubtless continue the business which their father established upon such a solid foundation. Mr. Featherstone possessed in an eminent degree the esteem of those brought into business relations with him. They recognized him as a man endowed by nature with more than ordinary shrewdness, and who had added to his natural gifts those qualities and advantages only secured by constant application and intense devotion to a chosen occupation. He was an accomplished mechanic, whose delight was to solve an intricate problem over which his co-workers were puzzling, and whose thoroughness of knowledge in everything pertaining to his craft assured perfect work. Although he watched every detail of business with scrupulous care, as does every successful man, he was of a generous disposition, and his charities were many. To his employees he was a strict master, but a most faithful friend, and always possessed their entire confidence. He married early in life, and leaves four sons. His remains will be removed from Dresden to Chicago for interment.

Parties formerly interested in the copper mines at Blue Hill, Me., upon which much work was done several years ago, and which were closed on account of the very low price to which copper fell, have lately taken the properties upon which the most important development work was done, and a new company have been organized, capital \$250,000, under the laws of Maine, to work the combined property, and operations have already begun. It is expected to very soon get out some paying copper.

The Leechburg Foundry and Machine Company, of Pittsburgh, whose works at Leechburg were partially destroyed by fire on March 29th last, the foundry buildings and machine shop being razed to the ground, have replaced these buildings. The new foundry building is 125 feet long by 60 feet span, in which steel ingot molds will be made. The new machine shop is 60 feet wide by 105 feet long. The works will be connected with the Pennsylvania Railroad by a switch, which will

give the company excellent shipping facilities, and are also equipped with the most modern machinery and appliances, and are now in full operation with orders enough on hand to run them full time the balance of the year.

Washington News.

(From Our Regular Correspondent.)

WASHINGTON, D. C., AUGUST 14, 1888.

Senator Allison said to-day that he thought it would be safe to say that the Revenue Reduction bill upon which the Sub-Committee on Finance have been engaged for so many weeks would be ready by this time next week. The sub-committee have gone over the entire sweep of the sources of revenue from customs and excise, and think that they have been able to compile a bill which will have a minimum effect, if any at all, in disturbing industries. These changes have been made in the customs duties. They have been incorporated in the bill with the co-operation and consent of the parties directly concerned, or at least by a representative share of them. There have been various speculations as to the prospects of the Senate bill after it reaches that body. The Democratic Senators some time ago announced their intention to antagonize it with the Mills bill line for line. This was then intended simply for campaign capital from their point of view. They are still of the same purpose, but from a very different point of antagonism. They have suddenly discovered that there is a very strong probability that if the Senate substitute as they understand it gets into the House it will stand a very good chance of passing. The tobacco tax provisions are favorably considered by the Democratic representatives of the tobacco districts of the South. These gentlemen say that as their own bill failed to give their constituents the relief which they demand, they will avail themselves of any other favorable opportunity to secure the passage of a bill for revenue reductions containing such provisions. The Administration Senators have just begun to realize that they have a more serious contest on their hands in their body than the utterance of mere campaign buncombe. It is now their purpose to make a struggle to prevent a vote being taken in the Senate before the election in November.

The Senate bill will be well under way by September 1. It is not the wish of the managers to get at a vote before the beginning of October. They then propose to bring the fighting to close quarters, first, by taking a vote in the Senate. Then the Republicans of the House will force the issue there. It would be a disastrous piece of business for the managers of the Mills bill to find the House concurring in the Senate substitute, and yet that is not an improbability, judging from the undercurrent of sentiment among a number of those who were at heart opposed to the Mills bill, but voted for it as a matter of party fealty. There has been method in the management of the revenue reduction measure in the Senate. If it should turn out as now not at all improbable it will stamp Senator Allison as one of the most adroit political managers in the Senate. It was largely due to his courage and determination that the Republicans of the Senate were kept up to the line of an aggressive fight. A number were willing to sneak out of the contest under cover of postponement until December. It was Senator Allison's speech, backed by a few other remarks at the conference at Mr. Evarts' residence, which brought the skulkers back into line.

The movement has now gone so far that there is no chance to retreat with credit.

Nor is there any disposition to make a retrograde movement, as every Republican Senator is now convinced that the right thing has been done and the Sub-Committee bill will receive their united and vigorous support in debate and in the vote.

The Loeb Respirator.

London *Engineering* gives an account of an exhibition recently held in London of Loeb's appliances, which are designed to enable the wearer to breathe and work with comfort in dense smoke, and also in poisonous gases. The appliance consists of a respirator with an india-rubber mouth-piece. The respirator is held by two projections, which are grasped between the teeth and the lips, additional security being provided by an elastic band passing round the head. The air is drawn in by the wearer through a series of small filters, containing respectively wet sponge, cotton wool, cotton wool damped with glycerine, and animal charcoal. These filters are very lightly packed, so that there is no resistance to the act of inspiration, and they are provided with valves which direct the air expired from the lungs into the external atmosphere. The entire apparatus weighs less than a pound, and can be used without previous practice. When it is to be employed in an atmosphere which is deadly in its character, as in the choke damp of mines, the air is drawn from some place where it is pure through a light india-rubber tube. The filter is then strapped to the waist of the wearer, and the respirator merely contains the valve, which cause the air to be drawn through the pipe and then to expire into the atmosphere. A tube up to 100 feet in length can be manufactured with facility. Protection is afforded to the eyes by a pair of spectacles with india-rubber rims, which press tightly on the cheek and brow and exclude all smoke. Mechanical wipers are added to enable the glasses to be cleaned without removal.

A man wearing the respirator spent half an hour in a building filled with dense smoke of a most pungent character without any difficulty, and afterward the inventor's representative, with the aid of a flexible air pipe, entered a room containing a dish of burning sulphur and remained there some time. It was clearly demonstrated that the respirator would enable the wearer to enter a building filled with smoke and discover the exact position of a fire. A few buckets of water promptly applied under such circumstances will do more good than the jet from a steam fire engine directed at random. On board ship, where the result of a fire is to fill the hold with smoke, this respirator would be most useful, and this fact has been recognized in the German navy, where Loeb's respirators form part of the official equipment. Many of the German fire brigades have also adopted them. They are being introduced into England by the Fire and Mining Appliances Syndicate, of 49 Queen Victoria street, E. C., London.

The Hastings Dormitory for Cambridge, now in process of erection, will be composed largely of iron beams and terracotta building blocks and the seven stairways all of iron, with a balustrade of wrought-iron strapwork. The exterior dimensions are 210 x 120 feet, and the walls are of brown mottled brick from Perth Amboy, N. J. The cost of the edifice is estimated at \$230,000.

Railway trains are now running direct from Paris to Constantinople. The next move is a railway from Constantinople to Bagdad, to cost \$75,000,000; distance, 1400 miles.

Lima Oil in Chicago.

Crude oil from Lima, Ohio, commenced pouring into the great tanks at South Chicago on Monday morning, after three weeks from the time of starting, through an 8-inch pipe 206 miles long. The oil is now flowing at the rate of 8000 barrels a day, and is designed for use as fuel. The plant at 100th street will be the distributing station for the Northwest. The company have secured 43 acres fronting the lake, where they will build side tracks. Pipe lines will probably be laid to the plant of the Union street company, the North Chicago Rolling Mills Company and the leading brick manufacturers. To smaller consumers the fuel will be delivered in tank cars. The National Transit Company, who handle the oil for the Standard Company, assert that 100 manufacturing firms are now using the new fuel in Chicago with great profit. They also say that the leading mills of Minneapolis and nearly all the great factories of the Northwest are under contract to use the oil. When necessary, the supply of oil by the pipe line can be increased to 24,000 barrels per day. This is accomplished by relay tanks, which are built along the route of the pipe, and which are kept filled. It will take about nine days to fill the two tanks now completed. In the meantime side tracks will be laid up to their sides and shipping will begin at once. Up to the present time the cost of oil to consumers has been 1.4½ cents per gallon. It is expected that the price will now be slightly reduced. Oil men antagonistic to the Standard Oil Company admit that there is at present some saving to manufacturers by using the liquid fuel. But they also say that when the majority of manufacturers get their burners in the price of petroleum will advance rapidly until they will be obliged to pay as much, if not more, for their fuel than before. They say that the burners are very expensive, and few firms will revolt against an increase in the price of oil unless it becomes too great a burden. The Standard people say the burners are not costly and are easy to remove. They are making iron-clad contracts with their patrons to furnish the petroleum at a fixed price.

Manitoba's Large Wheat Crop.

The wheat crop of 1887 in Manitoba, according to figures collected by the Winnipeg Board of Trade, was even more phenomenally large than was at first reported. The estimate of 12,000,000 bushels at first published was rightly regarded as an extraordinary one. To it is now added, however, another 2,000,000 bushels, bringing the total up to 14,000,000 bushels. The accounting is thus made:

	Bushels.
Wheat exported to Eastern Canada and Europe.....	8,500,000
Converted into flour in Manitoba....	2,600,000
Used as seed, 520,000 acres.....	1,100,000
In hands of millers and shippers and of farmers for close marketing.....	1,200,000
Total.....	13,400,000

The 600,000 bushels short of the 14,000,000 is made up of wheat used as feed on farms, and some still unthrashed and some grown at points too remote to be shipped by rail. It is calculated that about 1,900,000 bushels of wheat ground in the province was exported in the shape of flour, some of it to British Columbia and Asia, the rest to the East.

One of the present objections urged against embossed or chased metallic vessels is that the inner face is often irregular, jagged or broken. In order to remedy these defects, Mr. Z. T. Hall, of the firm of Hall & Carpenter, Philadelphia, has patented a vessel, composed of an outer

wall which is embossed or chased, and an inner wall which is perfectly plain and smooth. The two walls are united at the top and bottom by beads or flanges, which close the joints between the two parts and give the vessel the appearance of an expensive article at a greatly reduced cost. The handle is secured to the outer wall by soldering or other suitable means. The invention is applicable to bowls, pitchers, teapots, coffee-pots and utensils of this general character.

The Theisen Surface Condenser.

The use of condensers with steam engines is frequently rendered difficult by insufficient supply of condensing water, of which from 20 to 25 times the amount of feed water is required. If it were possible to cool the condensing water quickly it could be used over and over again. In some cases this is effected by the use of cooling ponds, which, however, occupy considerable space. In Theisen's apparatus, described in *Dingler's Polytechnisches Journal*, the cooling is effected by an air-blast from blowing fans. The apparatus consists essentially of a plate-metal case, with surface condenser tubes fixed in the lower half of the case and immersed in water. The steam to be condensed circulates in these tubes, and the resulting water is pumped out by an air-pump, and finally fed into the boiler by the feed-pump. The condensing water is cooled by a number of metal disks, which revolve slowly on horizontal spindles, dip partly into the water condensing, and as they revolve carry a small amount of water on their surfaces; a current of air from two screw fans fixed at one end of the case containing the condenser impinges on the surfaces of the disks. The cooling action takes place by the evaporation of the moisture on the disks, and as these revolve they take up the heat from the heated condensing water to be cooled again by the air current. They are stated to take so much heat from the water as to keep it cool enough for condensing the steam. In Messrs. L. Mannstadt & Co.'s rolling mill, at Kalk, near Cologne, Germany, the apparatus has been adapted to engines indicating 470 horse-power. These engines, it is stated, were formerly worked as non-condensing engines, and the saving by condensing is about \$340 monthly in coal.

The tropical fruit trade of New York, which within a few years has passed from sailing vessels to steamers, is to undergo another radical change by the introduction of six new steamers owned by the West Indian Lloyd Steamship Company. Two of the steamers will ply between New Orleans and Savanilla, touching at intermediate ports and connecting at Truxillo with two other vessels of the line, which will run between New York and Livingston, Guatemala, Nassau, Jamaica, Truxillo and the Island of Inagua, the nearest of the West Indian Islands to New York and Great Britain. It is intended to make this island a central point. The vessels will register from 1800 to 3500 tons. The one building at Whitehaven will have four screws, and all the others are to have twin screws, with triple expansion engines. The four-screw vessel will have her propellers fitted into her hull within about 1 foot of the bottom of the keel. The screws will be hung on crank-shafts coming up through watertight compartments, and the machinery will be so arranged that the propellers can be hauled up the side of the vessel and a defective blade removed and a good one substituted. The vessels will be fitted with three banana decks and will be fitted with refrigerators from stem to stern.

Foreign Markets.

EQUIVALENTS

Franc, Peseta or Lira.....	Cents.....
Florin (Netherlands).....	19.3
Florin (Austria).....	40.2
Milela (Portugal).....	35.9
Milela (Brazil).....	51.18
Mark (Germany).....	54.8
Kilogram.....	23.8
Picul.....	Pounds.....
	220.5
	134.

BRAZIL.

PARA. August 7, 1888.—*India Rubber*.—During the last few days 160 tons of fine and coarse have been taken for New York at full prices.—*Per cable direct*.

EAST INDIES.

PENANG, June 22, 1888.—*Tin*.—There has been no demand for either Europe or America; fortnight's receipts reached 7000 piculs, of which Chinamen took 5000. The market for Laroot Tin opened at \$34.32½ per picul, and closes at \$31.80. There have so far been shipped to England 76,227 piculs. *Exchange*.—Four months' bank bills on London, 3/0%.—*Schmidt, Kustermann & Co.*

BATAVIA, August 10, 1888.—*Tin*.—The Billiton Company will offer at auction on the 20th inst. in this city, 14,000 piculs of Tin.—*Per cable direct*.

SPAIN.

BILBAO, July 21, 1888.—*Iron Ore*.—The position of Ore has undergone but little change during the week, quotations remaining unaltered. Rubios at 6/10 @ 7/3, and Campanil at 7/6 @ 8/. A few cargoes were taken of each, the latter at 8/. Week's exportation amounted to 71,387, against 98,897 the previous week; total shipments since January 1 sum up 2,135,387 tons, against 2,430,300 same time last year. *Pig Iron*.—The export for the week was 3626 tons, while coastwise 325 tons were shipped. The Vizcaya Company quotes Pig Iron 57 @ 60 pesetas per ton on the spot, and 55 @ 58 futures. Lingotillo at Huelva and Seville, 65 pesetas.

Spanish Exportation During the first Four Months.

	1886.	1887.	1888.
	Tons.	Tons.	Tons.
Calamine.....	16,522	14,129	11,186
Pyrites.....	300,562	333,431	341,009
Iron Ore.....	1,874,318	2,281,000	1,926,202
Pig Iron.....	26,882	49,283	28,768
Precipitate.....	10,660	11,696	12,026
Quicksilver.....	501	777	664
Pig Lead.....	46,977	56,051	53,934

Totals.....2,276,422 2,746,367 2,373,789
Showing a falling off in everything but Copper products.—*Bilbao Maritimo y Comercial*.

GERMANY.

HAMBURG, August 4, 1888.—*Iron*.—Pig Iron has remained dull in Rhenish-Westphalia; Spiegel in particular suffers from a lack of American demand, nor is it active for home use, and some makers may have to temporarily abandon turning it out after awhile, should there not be a favorable change soon. Meanwhile it remains unaltered, 56 marks per ton for 10 @ 12 % Manganese. Forge Pig is gradually increasing in stock; Siegen sold the same as low as 46 @ 47. Foundry Pig still moves off tolerably well at 51 @ 57. Both Bessemer and Thomas are rather weaker; Luxembourg sells at 38.70 @ 40, English Bessemer at 42/6. During the first six months German Pig Iron production, including Luxembourg, has been 2,106,714 tons, against 1,848,481 in 1886; June production was 350,404 tons, of which 172,889 Forge and Spiegel; 53,952 Bessemer; 102,564 Thomas, and 40,969 Foundry. Merchant Iron continues inactive; Hoop Iron is so much neglected at home that notable sacrifices have to be made to push it off for export; the quotation is 137.50 @ 140. Boiler Plates remain firm at 170 for 5 mm. diameter, and Tank Sheets at 150; the former remain in brisk request both for export and home use. Thin Sheets begin to sell with greater ease; a syndicate will soon raise prices. The disagreement among makers in the Wire Nail and Wire branches points to lower prices in prospect. Neither machine shops nor foundries have reason to complain of a lack of work, still the prices they get are not very remunerative. Car works were seldom so loaded down with orders. Steel works are getting on very well. Advances from Upper Silesia are in every way most satisfactory as regards the Iron trade and outlook for the same. *Petroleum*.—Tank steamers are gradually multiplying at the mouth of the river Weser, whence four of together 11,200 tons are trading regularly between American ports and Bremen and Hamburg, conveying Crude Oil at life rate of 600,000 barrels per annum, tank cars, of which there are 70 employed distribut-

ing the Oil inland. Another company has begun this trade with two steamers. As this tank transportation is gradually doing away with the shipment of Crude in barrels, empty barrels are getting scarce, and a close imitation of American is now made in Germany. Metals are firm and unaltered.—*Borsenhalle*.

Production of Chromium Pig Iron.

E. G. Odelstjerna states that, in the first attempts at Sweden to produce pig iron with a high percentage of chromium, it was found to be a matter of extraordinary difficulty to obtain a sufficient degree of heat. At a temperature at which wrought iron is a thin fluid, the contents of the crucible in which the experiments were made remained unchanged. On employing a furnace of the Wittenstrom type, however, small quantities of chromium pig iron were produced, but even then the temperature was not high enough at first to fuse the globules of metal together. This became possible in modifying the composition of the slag. The cost of the process as carried out in these furnaces was too high to enable it to compete successfully with the poorer chromium pig iron produced elsewhere in blast furnaces using coke as fuel. Regenerative crucible furnaces were therefore tried instead, but although the temperature attained was high enough to melt away the Dinas bricks used in the construction of the furnace, the chromium pig iron produced could not be obtained in a thoroughly fused condition, the reduced metal being always intimately mixed with slag. Complete fusion of the metal only takes place at a temperature at which the best graphite crucibles soften—at a temperature, that is, probably exceeding the melting point of platinum. By this means a pig iron can be produced containing 70 per cent. of chromium; it contains less carbon than the metal poorer in chromium, and in consequence of its greater percentage of this latter element, it acts less as a carbonizing material when added to the steel bath than would a metal containing, say, only 45 per cent. of chromium.

By the use of this chromium pig iron an open-hearth steel can be produced which will compete in every respect with the best English crucible steel, and in many cases even excel it. Chromium steel is harder than ordinary steel with the same percentage of carbon, but it is much more difficult to harden. To obtain a useful chrome tool steel the carbon must be kept at least 0.2 per cent. lower than would be used were no chromium present in the metal, and in its place must be added that amount of chromium which will give the requisite degree of hardness. A steel can be obtained in this way which will stand a much greater welding heat than will ordinary carbon steel, and be at the same time both harder and tougher. The percentage of carbon in a chrome steel should never exceed 0.9. The percentage of chromium need rarely exceed 1.5 per cent. If it is desired to produce a harder steel than that containing 0.90 per cent. of carbon and 2.0 per cent. of chromium, 0.2 per cent. of silicon must be present to insure freedom from blow-holes, the phosphorus, owing to the presence of the silicon, being at the same time kept below 0.3 per cent. The metal should be cast into ingots of small size, not exceeding 5 inches square, to prevent liquation during the cooling of the metal.

The Connellsville Coke Trade.—Of the 12,061 ovens in the region 9337 are in blast and 3724 idle, with an approximate total output of 93,723 tons. The figures for the last week were: In blast, 8921; out of blast, 4140; output, 86,342 tons. This shows an increase of 416 active ovens and 6986 tons of coke. All the larger operat-

ors are now running six days in the week. The shipments for last week aggregated 5350 cars, distributed as follows: To Pittsburgh and the rivers, 950 cars; to Western points, 2700 cars; to Eastern points, 1700 cars. The figures for last week were: Pittsburgh, 925; West, 2700; East, 1700; total, 5325. The total shipments for the month of July were 20,560 cars, distributed as follows: To Pittsburgh, 4000; West, 10,700; East, 5860. The daily average was 790 cars, against 787 in June, when but 19,160 cars were shipped. Prices continue at \$1 per ton, with suspicions that some operators are cutting a shade lower in the race for trade. The Western markets are reported dull. At Chicago coke is quoted at \$3.90 per ton, and at East St. Louis \$4.35 per ton. The crushed coke trade seems to be growing steadily. Transient trade continues good, about 75 cars of coke per day being the average. The shipments, however, vary greatly, running all the way from 28 to 150 cars per day.

A Modification of the Bessemer Process.—The Carlsson modification of the Bessemer process is employed in Sweden in the treatment of a charcoal pig iron containing about 1.5 per cent. of silicon, 0.1 to 0.15 of manganese, 3.9 of graphite and 0.1 of combined carbon. The slag produced in the production of this pig iron approximates more closely to a tri-silicate than a bi-silicate, alumina being considered as a base. After the pig iron has been charged into the converter it is blown for about five or six minutes, until the blue flame appears that marks the commencement of the combustion of the carbon. The blow is then stopped, and a definite proportion of the charge, varying with the quality of the metal it is desired to produce, is poured into a ladle of peculiar construction, so arranged as to show the weight of the metal charged into it, the slag being carefully removed. This portion of the charge usually contains 4.15 per cent. of carbon, 0.05 of silicon and 0.07 of manganese. The remaining portion of the metal in the converter is then blown until most of the carbon has been eliminated and the bath converted into malleable iron. The portion of the metal previously removed, together with any necessary additions required for special purposes, is then added to the bath. When the reaction that ensues is ended the metal is ready for pouring. Before this addition is made the bath usually consists of metal containing a trace of silicon, 0.03 per cent. of manganese, 0.05 of carbon, and, as a maximum, 0.02 of sulphur. As this metal is usually red-short some rich manganese iron is added before the addition of the second portion of the metal from the ladle. The percentage of silicon in the final product is usually about one-tenth of that of the carbon, so that steel containing 0.2 of carbon would also contain 0.02 of silicon.

The effects of stimulated emigration were forcibly shown in the testimony given last week by Dr. Hoyt, for many years past secretary of the New York State Board of Charities. He stated that the foreign-born inmates of our almshouse, workhouses and correctional institutions outnumbered the natives four to one. In our insane asylums there are two foreigners to one native. Of the offenders convicted in our courts there are three foreigners to one native, and outdoor relief to the poor is administered to five foreigners to one native. This vast disproportion of the foreign element among the paupers, lunatics and criminals that are a burden upon the community he attributed mainly to the efforts made in Europe to get rid of these classes by sending them to this country.

TRADE REPORT.

Chicago.

Office of *The Iron Age*, 95 and 97 Washington St.,
CHICAGO, August 13, 1888.

Business shows a marked improvement, with Steel Rails as almost the sole exception. In consequence of the heavier demand now being experienced prices are firmer, and a decided upward tendency is noted in many branches. Until Steel Rails begin to move more freely, however, it is not to be expected that prices of heavy material will attain much higher figures.

Pig Iron.—The market has been very active during the past week, the volume of business greatly exceeding the average of its immediate predecessors. While but few large sales are reported, there has been a multiplicity of transactions ranging from 100 to 500 tons. Buyers are now seeking sellers and freely offer old rates in the hope that they will be accepted; but few furnace agents find themselves able to supply their trade at such figures. Advances of 25¢ @ 50¢ are frequent, and if present conditions continue the upward movement will be general. Lake Superior Charcoal has been sold so freely that but a small part of the coming twelvemonth's output remains to be marketed, and for this a much higher price will have to be paid, if appearances are not altogether deceptive. Soft Irons are considerably firmer, and makers are threatening to advance in the near future, claiming to have now sufficient warrant for such action. Southern Coke Irons are scarce and higher, the supply of low grades having been exhausted by the demand from other markets. Lake Superior Coke shows no advance as yet, but the situation in it is liable to change quickly as the available supply is by no means large, with the Calumet Furnace out of blast, although the new Mayville Furnace is performing an active part in meeting the local demand. Notwithstanding the dullness in the Steel Rail trade, the price of Bessemer Pig Iron continues to harden. Cash quotations are as follows, f.o.b. Chicago: Lake Superior Charcoal, all numbers \$19 @ \$20; Alabama Car-Wheel, \$26.25; Southern Charcoal Foundry, No. 1, \$18 @ \$19; Jackson County Softeners, No. 1, \$18 @ \$18.50; Hocking Valley, Soft Foundry, No. 1, \$17 @ \$17.50; American Scotch (Blackband) No. 1, \$18 @ \$19; other Ohio Scotch Irons, No. 1, \$17.50 @ \$18; Lake Superior Coke, No. 1, \$17 @ \$17.50; No. 2, \$16 @ \$16.50; No. 3, \$15 @ \$15.50; Southern Coke, No. 2, \$17; No. 2½ and Open Bright, \$16.50; No. 3, \$15.50 @ \$16.

Bar Iron.—Large orders have been placed for delivery during the next 12 months by the agricultural implement manufacturers. Terms are private, but it is intimated that about 1.60¢, f.o.b. Chicago, was the prevailing rate, some concerns having been able to buy at a slightly lower figure. Manufacturers now have a general impression that prices can be sustained on a slightly higher basis than has recently prevailed, as so much of the productive capacity of the mills has been absorbed by these large orders, and as the general trade seems also disposed to take hold more freely. Quotations of 1.65¢, half extras, f.o.b., Chicago, for carload lots, are general, few sellers being willing to name anything lower. Store prices are unchanged, being 1.75¢ to 2¢, according to quantity and quality.

Structural Iron.—A steady trade is in progress, but small lots are most frequently called for. The mills are disposed to ask slightly higher prices. Store quo-

tations are as follows: Angles, 2.40¢ @ 2.70¢; Tees, 2.60¢ @ 2.90¢; Beams and Channels, 3.80¢. Mill lots are as follows, f.o.b. Chicago: Angles, 2.20¢; Universal Plates, 2.30¢; Tees, 2.45¢; Beams, 3.40¢.

Plates, Tubes, &c.—An unusually good business has been done in Plates, and dealers found their stocks heavily depleted at the end of the week. The mills are holding prices very stiffly, but no changes have been made in store prices, which are as follows: Heavy Sheets, Nos. 10 to 14, 2.65¢; Tank Iron, 2.55¢; Tank Steel, 2.80¢; Shell Iron, 3¢; Shell Steel, 3.25¢; Flange Iron and Steel, 4¢; Fire-Box Steel, 4.75¢ @ 5.75¢; Boiler Rivets, 4¢ @ 4.25¢; Ulster Iron, 3.75¢; Boiler Tubes, 60 % and 10 % off on 2½-inch and larger and 62½ % off on 2-inch and smaller.

Sheet Iron.—A decidedly stiffening tendency is to be noted in this line, which is due to a variety of reasons. First, this is now the time of the year when a most active demand is experienced for fall delivery. Second, a number of the mills represented here have oversold their capacity, and others have found their deliveries interfered with by the derangement in business caused by the strike in July. Third, the Aurora mill in Indiana, whose owners recently made an assignment, had large contracts for delivery to Chicago merchants, who will have to make other arrangements if the mill is not very soon put in operation again. From these causes a scarcity has arisen, which is quite seriously felt, and prices are at least \$3 per ton higher than when they were at the lowest point of the summer. Manufacturers' agents are generally asking 3¢ for No. 27 in carload lots, f.o.b. Chicago. Jobbers name 3¢ for No. 24, 8.10¢ for Nos. 25 and 26, and 8.20¢ for No. 27. To close buyers these figures are slightly shaded.

Galvanized Iron.—Prices have stiffened up a little in sympathy with Black Sheets, but small lots are still quoted at 60 % and 5 % off, and Charcoal at 60 % and 10 % off.

Merchant Steel.—Some large contracts have been placed by the agricultural implement manufacturers, and others are still in the market. The trade from store has been much better than usual. Prices from store are unchanged, although the heavy contracts referred to were taken at quite low rates. Quotations from store are as follows: Bessemer Bars, 2.30¢ @ 2.40¢; Tool Steel, 8½¢ @ 9½¢; Specials, 13¢ @ 25¢; Crucible Spring, 4.40¢; Open-Hearth Spring, 2.90¢; Open-Hearth Machinery, 2.75¢ @ 3¢; Crucible Sheet Steel, 7¢ @ 11¢.

Steel Rails.—A few inquiries have made their appearance, but actual business is very hard to get. Prospects are far from bright. Quotations range from \$31 to \$31.50, but it is intimated that these rates might be shaded on competitive business in the South.

Old Rails and Wheels.—A number of sales of Old Iron Rails, in lots of 300 to 1000 tons, are reported at \$19.75 @ \$20. The railroads now do as little repairing as possible, which is making Old Rails very scarce, so that prices may go still higher in view of the existing demand for them. Old Car-Wheels are in good demand, and some sales have been made at \$19 @ \$19.50. They are also scarce and prices show an upward tendency in sympathy with Charcoal Pig Iron.

Scrap.—Inquiries have improved, but buyers all seek cheap material. No sales of No. 1 Wrought are reported. The demand for Cast is very light at present. Mill Iron is in most request, and next come Borings, Turnings, &c. Mixed country Scrap is quoted at \$11.50 @ \$12.50. Selling quotations for carefully selected are as

follows, per ton of 2000 lb: No. 1 Forge or Railroad Shop, \$17 @ \$18; Track, \$16.50 @ \$17; No. 1 Mill, \$13.50 @ \$14; Light Wrought, \$9 @ \$10; Horseshoes, \$17; Axles, \$23; Cast Machinery, \$13.50 @ \$14; Stove Plate, \$10 @ \$10.50; Cast Borings, \$9; Wrought Turnings, \$10 @ \$11; Axle Turnings, \$12 @ \$13; Coil and Leaf Steel, \$14 @ \$15; Locomotive Tires, \$15.

Hardware.—Business in Shelf Hardware continues very active for the season, jobbers reporting their force well occupied in taking care of the orders received through the regular channels. Builders' Hardware is moving more freely as buildings begun early in the season approach completion. Prospects are very bright for a good fall trade, reports from all sections tributary to this section being of a most encouraging character. Prices show no special change.

Nails.—Manufacturers' agents have had a good demand and most of them report large sales. They still quote \$1.75, Wheeling, for Steel Nails, but this price is being shaded by factories more favorably located for this market. Much interest is taken in the proposed Cut-Nail combination among the manufacturers, and the belief is growing that prices may be advanced on or before the 1st of September through that influence. Jobbers report a fair and increasing trade. Some of them have recently been selling Steel Nails at \$1.95 and Wire Nails at less than \$2.50 from store, but they have all stiffened up and now name \$2 as the bottom price for Steel and \$2.50 for Wire Nails.

Barb Wire.—In this immediate section no business is now being done in this line, as the retail merchants are without any demand from their customers, who are busily employed in securing their crops. Nominal quotations are still 3¢ for Painted and 3.75¢ for Galvanized, in small lots.

Pig Lead.—A heavy week's trade is reported, sales aggregating 1200 tons, spot and for future delivery. Prices ranged from 4¼¢ to 4½¢. Manufacturers report a fair demand for Lead products, with a promising outlook for the fall.

Copper.—A moderate business is in progress, consumers being very conservative and carrying only light stocks for fear of lower prices.

The freight rate on scrap iron from Chicago to Youngstown has been reduced to \$1.85 per ton in consequence of a falling out between some of the railroads connecting the two points.

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St.,
PHILADELPHIA, Pa., August 14, 1888.

Pig Iron.—The market appears to have become pretty well settled on the basis of prices quoted during the past two or three weeks. There is not the slightest indication of change at the moment, and the probabilities seem to be that prices will continue as they are for some time to come. Buyers are no way anxious to place orders in advance, and as holders are not accumulating stock they are quite as indifferent about selling. There is some prospect of an increase in production, however, but as consumption is likely to increase in proportion, there is no reason to expect that the supply will be any more excessive than it is at present. The position is, therefore, a very healthy one, as matters are in a shape to respond at once to favorable influences from other sources, and so far as can be seen there is nothing likely to affect the market unfavorably, reports from all quarters showing a moderate degree of activity, with a very confident feeling in regard to the future. The general complaint is in regard to prices. Almost anything can be sold, providing

the price is made low enough, but having got prices down it is no easy matter to get them up again. As to the quotations for Pig Iron they remain about as they were a week ago, steady and firm. No. 1 Foundry at tide commands from \$18 to \$19, according to brand; No. 2, \$17 @ \$17.50; Gray Forge, \$15.75 @ \$16.25. It is a difficult matter to secure anything fully up to standard at inside quotations, and almost as much so to secure outside rates, except for small lots of choice quality, the bulk of the business being at medium rates. Southern Irons could be had at less money, say \$15 @ \$15.50 for Gray Forge and \$17.50 @ \$18 for No. 1, but there is no demand, neither is there any pressure to sell, although in a casual way agents name the above figures as their ideas of value.

Foreign Iron.—There is more disposition to place orders than we have seen for some time, although buyers and sellers are a long way apart in their views. Bids of \$18, c.i.f., duty paid, have been made for round lots, against offers to sell at \$19.50, with a probability that both sides would concede something if there was a fair prospect of business being closed.

Blooms.—There is a good demand for steel blooms, and prices are steady at rates quoted herewith, say, Slabs and Billets from \$29 to \$35, f.o.b. cars at mill, according to analysis; Charcoal Blooms, \$52 @ \$54; Run-out Anthracite \$42 @ \$44; Scrap Blooms, \$33 @ \$35 "bloom" ton of 2464 lb. Foreign at tide, c.i.f., duty paid, \$29 @ \$30 for Nail Slabs; \$31.50 @ \$32.50 for 4 x 4 Billets, and \$35 @ \$39 for Siemens-Martin, price according to analysis, &c.

Muck Bars.—There is a good demand, and with light offerings prices are again a shade firmer, \$28 at Philadelphia being the usual asking quotation, with sales at from \$27.50 to \$28. delivered.

Bar Iron.—There is a good deal of inquiry in addition to a very satisfactory amount of sales, while the prospect for a large consumption during the fall months seems to be quite encouraging. Prices have not improved, however, and that appears to be the most unsatisfactory part of the business, and for the present the outlook in that respect is not what could be desired. As we said last week, the large mills will have to be filled up before any advance can be made, and while they are perhaps gaining a little, they are not getting very much ahead, the week's deliveries on an average being but little more than the week's sales, with possibly an exception here and there. Prices range from 1.75¢ to 1.85¢ for Best Refined Bars. Buyers of large lots can get in at the inside figure, while smaller lots or special makes will command the outside quotation. Skelp Iron is still in good demand, with sales aggregating nearly 2000 tons of Grooved at about 1.08¢ delivered, and still further orders waiting to be placed at about the same figure.

Plate and Tank Iron.—There is a fair general demand for Plates in small and moderate sized lots, and mills are gradually getting work ahead. Prices are therefore a shade firmer and in some cases a trifle higher, although there are irregularities, according to the immediate requirements of the mills. Those that are pretty well filled up, for instance, are naturally firmer than those less favorably situated, but, as we said before, the average position is one of improvement, both as regards prices and the volume of business. In ordinary cases prices are about as follows: Ordinary Plate and Tank Iron, 2¢ @ 2.10¢; Shell, 2.4¢ @ 2.5¢; Flange, 3.5¢; Fire-Box, 4¢; Steel Plates, Tank and Ship Plate, 2.3¢ @ 2.4¢; Shell, 2.7¢; Flange, 3¢ @ 3.4¢; Fire-Box, 3.4¢ @ 4.1¢.

Structural Iron.—There is no special movement in this department, although in sympathy with the rest of the market the feeling is a little better. The week's deliveries were about equal to the sales, so that there is rather sharp competition to secure work ahead. Prices are somewhat irregular, but in ordinary cases about as follows: 2¢ @ 2.10¢ for Bridge Plate; 2¢ @ 2.10¢ for Angles; 2.8¢ @ 2.7¢ for Tees, and 3.3¢ for Beams and Channels, Iron or Steel.

Sheet Iron.—The demand is fair and on the whole averages pretty well with other departments. Good makes command full prices, but other descriptions are irregular, and in some cases have been offered at extremely low figures. Quotations for small lots, best makes, are about as follows:

Best Refined, Nos. 26, 27 and 28... 3½¢ @ 3½¢
Best Refined, Nos. 18 to 25... 3¢ @ 3½¢
Common, ½¢ less than the above.
Best Bloom Sheets, Nos. 26 to 28... 4½¢ @ 4½¢
Best Bloom Sheets, Nos. 22 to 25... 4¢ @ 4½¢
Best Bloom Sheets, Nos. 16 to 21... 3½¢ @ 3½¢
Blue Annealed... 2.8¢ @ 3¢
Best Bloom, Galvanized, discount... 62½¢
Common, discount... 67½¢

Merchant Steel.—A general improvement is noticeable with a large demand for Tool Steel as the leading feature. Prices for lots from store are quoted as follows: Tool Steel, 8½¢; Machinery, 2½¢; Crucible Spring, 4½¢; Open-Hearth Ordinary Spring, 2½¢ @ 2½¢; Crucible Machinery, 5¢; Best Sheet Steel, 10¢; Ordinary Sheet, 8¢.

Steel Rails.—In this vicinity business is very dull, although for the time being mills are moderately well employed. The feeling is said to be a little firmer, but there are no indications of buyers coming in to any extent even at the present low figures. The usual quotations are \$29.50 @ \$30 at mill, but good buyers could doubtless obtain concessions on desirable orders, as to quantity and date of delivery.

Old Rails.—The market has not improved very much, although there is a somewhat better demand. Holders ask \$21 for T's, ex-ship, and from \$22 to \$22.50 in store, with bids of \$20.50 ex-ship for a lot now in port. Sales at \$22 @ \$22.50 delivered at mills in the interior.

Scrap Iron.—Market quiet, but sales continue to be made at the old prices—viz.: \$18 @ \$19 for cargo lots; \$20 @ \$21 for carload lots, delivered, or for choice \$21.50 @ \$22; No. 2 do., \$14 @ \$15; Turnings, \$13 @ \$14; Old Steel Rails, \$19 @ \$20; Cast Scrap, \$14 @ \$15; do. Borings, \$9 @ \$10; Old Fish Plates, \$24 @ \$25. Old Car-Wheels, \$17 @ \$18, Philadelphia, or its equivalent.

Wrought-Iron Pipe.—There is an increased demand for all sizes of Pipe, and mills are pretty generally well filled with orders. A firmer tone is noticeable, although, as yet, there is no quotable change in prices. Discounts are as follows: Black Butt-Welded, 55%; on Galvanized do., 45%; on Black Lap-Welded, 65%; on Galvanized do., 52½%; on Boiler Tubes, 60%.

Nails.—There is some inquiry for Nails, but, as yet, very little business has resulted. Prices are weak and unsteady, and, while the sharp competition to secure trade continues, any material advance seems very unlikely. The Western pool, for some unknown reason, has failed to organize.

Park Bros. & Co., Limited, Pittsburgh, Pa., have recently opened a branch house, located at 523 Arch street, Philadelphia, Pa., where they carry a complete stock of Crucible Steel, Copper, Open-Hearth Steel and the other specialties manufactured by them. Mr. Robt. K. Story, who has been appointed manager, is well known to the Iron and Steel trade in the East, having

been manager of Pittsburgh Tube Company, Pittsburgh, Pa., prior to which he occupied the same position with the New York branch house of the American Tube and Iron Company.

Edmund D. Smith & Co., No. 224 S. Third street, Philadelphia, have been appointed exclusive Eastern agents for the De Bardeleben Coal and Iron Company, of Bessemer, Ala., the agency covering the entire Atlantic seaboard. The De Bardeleben Company have one of the finest plants in the South, embracing two stacks of 150 tons each now in operation and two more expected to be finished this year. The ores they will use are very rich in iron, low in phosphorus, while their own ovens and coal mines furnish their coal. Their intention is to furnish a first-class foundry and mill iron, quality being of the first importance.

Louisville.

LOUISVILLE, KY., August 13, 1888.

Pig Iron.—The market remains steady, though there has not been as heavy buying during the past week as marked the purchases of the preceding one. Consumers who have laid in what Iron they desire for the next three or four months are waiting to see which way the market turns before making further purchases. If Iron advances in the East 50¢ per ton there will be heavy buying, as another slight advance will be considered undoubted evidence that bottom has been reached. Softeners are in active demand, owing to danger of low water preventing shipments of this grade of Iron from the Ashland district. Consumers of Iron are much surprised at the small amount of Iron offered by Southern furnaces. The reason is this, that the older furnaces are largely oversold at better prices than can be obtained for the Iron now. So far there have been but three or four new furnaces gone in blast, and it is now thought that the several new furnaces which were expected to make Iron this year will not be in blast before 1889, owing to scarcity of Ore and Coke. Among the larger sales during the past week have been 2000 tons Silver Gray, 1500 tons No. 2½ and 1000 tons No. 2 Foundry. Old Wheels are in active demand at about \$19.

Southern Coke, No. 1 Foundry...	\$16.25 @ \$17.25
" No. 2 "	15.25 @ 16.25
" No. 2½ "	14.75 @ 15.25
Hanging Rock Coke, No. 1 Foundry...	16.75 @ 17.25
Hanging Rock Charcoal, No. 1 Foundry...	20.50 @ 22.75
Southern Charcoal, No. 1 Foundry...	17.50 @ 18.00
Silver Gray, different grades...	18.75 @ 14.50
Southern Coke, No. 1 Mill, Neutral	13.00 @ 14.00
" No. 2 "	12.50 @ 13.50
" No. 1 " Cold Short	12.50 @ 13.50
Charcoal, No. 1 Mill	18.75 @ 15.00
White and Mottled, different grades	12.25 @ 12.75
Southern Car-Wheel, standard brands...	21.75 @ 24.75
Southern Car-Wheel, other brands	18.75 @ 20.75
Hanging Rock, Cold Blast...	22.75 @ 24.75
Hanging Rock, Warm Blast...	18.75 @ 19.75

Pittsburgh.

Office of The Iron Age, 77 Fourth Ave.,
PITTSBURGH, August 14, 1888.

There has been no important change in the general industrial situation, with the exception that the Window Glass Factories, after the regular summer vacation, have been started up. With possibly one or two exceptions the Iron mills have all signed the wage scale and resumed operations. The Steel mills are all at work, some of them quite busy, and the largely increased consumption of Pig Iron has caused a good many of the furnaces that were out of blast to blow in. It is pretty generally admitted that our manufacturers will have a good fall and winter trade.

Pig Iron.—The general position of the market does not differ much from that of a week ago; there is no abatement in demand, buyers continue more numerous

than sellers, and prices are still tending upward. As compared with the prices ruling in the early part of July, there has been an advance of 75¢ per ton on good brands of Mill Iron, and, as furnacemen are inclined to the belief that prices will go still higher, it is not strange that they are indifferent about making additional sales. Some of them, while willing to sell to a fair extent for immediate or near-by delivery, are refusing to contract for future delivery. A considerable proportion of the Iron reported sold during the past three or four weeks was taken on speculation, and will be held at furnaces subject to orders of purchasers. Consumers, however, have not been idle during the past few weeks, and most of them are pretty well covered; some of them have covered their requirements for several months to come; however, there are those who let the market get away from them by holding back—they could see no good reason why there should be an advance, but it took place all the same, and these same parties will be obliged to stock up at the enhanced cost, which will give competitors who bought before the advance an advantage over them. Foundry Irons have not advanced much as yet, nor is it likely that they will until there is a considerably improved demand. There is an evident disposition to boom the Bessemer market, and sales are reported at a higher price, there is reason to believe, than can be obtained. We quote prices as follows:

Neutral Gray Forge.....	\$14.25 @ \$14.75, cash
All Ore Mill.....	15.25 @ 15.75, "
White and Mottled.....	13.50 @ 14.00, "
No. 1 Foundry.....	16.75 @ 17.00, "
No. 2 Foundry.....	15.75 @ 16.25, "
No. 3 Foundry.....	15.00 @ 15.25, "
Charcoal Foundry.....	20.00 @ 24.00, "
Cold Blast Charcoal.....	25.00 @ 28.00, "
Bessemer Iron.....	17.00 @ 17.25, "

Included in the sales reported were 1700 tons Gray Forge at \$14.75, cash, and 5000 tons Bessemer at \$17.25, cash. It is doubtful whether standard brands of Gray Forge can be had within the next week under \$15, cash, although up to the present writing we are not advised of any actual sales having been made above \$14.75, cash.

Muck Bar—Is firmer and more active; we are advised of sales at \$26.50 @ \$27, cash, which may now be regarded as the ruling quotations, with a prospect of going still higher in sympathy with Pig Iron.

Manufactured Iron—Nearly all the mills are again in operation, and there is no scarcity of orders, but there has been no improvement as yet in prices, although they are firmer, in sympathy with the raw article; indeed, manufacturers generally are not very anxious about filling up their order books at present prices, which, it is claimed, afford little or no margin for profit. It is evident that if the raw article continues to advance the products will sympathize, and the effect is to make buyers more anxious to buy and sellers less anxious to sell. We continue to quote upon a basis of 1.70¢ @ 1.80¢ for Bars, 60 days, 2% off for cash. These quotations are for first quality Iron.

Nails—There is no improvement to note in trade so far as relates to Pittsburgh. Manufacturers are refusing to sell below the card, while buyers are able to do considerably better elsewhere. The card remains unchanged at \$1.90, 60 days, 2 per cent. off for cash, for car lots and upward, but buyers, it is claimed, can obtain all they want at competing points west of Pittsburgh at \$1.75. Manufacturers think they can make Nails as cheap as any of their competitors, but they claim that even at full card rates there is only a fair margin for profit, and rather than cut below they will let their factories stand idle, as some of them are doing.

Old Rails—There is an increasing demand, caused by the starting up of the mills in the Shenango and Mahoning val-

leys, where the consumption is much larger than in Pittsburgh, and prices are firmer and higher. Sales of some 2000 tons American Tees at \$21.50, cash, and they are not offering very freely at any price. Sale of Old Steel Rails at \$19.50. Sellers of Old Iron Rails report the supply light, and they look for still higher prices.

Steel Rails—Are quoted at \$31 cash at mill here for Heavy Sections, and a desirable order might be placed below the quotation named. The mill here is still running full time.

Billets, &c.—There is a continued steady demand for Bessemer Steel Billets, which may be quoted at \$28.25 @ \$28.75, cash, as to quality, size and delivery. Sale of Nail Slabs at \$27.65, delivered free on cars at Wheeling. Steel Rail Crops are quoted at \$17.75 @ \$18, and Bloom Ends about the same, with an increasing demand for both.

Merchant Steel—There is a fair demand, but no recent change in prices. Best brands of Tool Steel, 8½¢ per lb; Crucible Spring, 4½¢; Crucible Machinery, 5¢; Open-Hearth Machinery, 2½¢.

Railway Track Supplies—No change in prices, which are still quoted at 2¢ for Spikes, 30 days, delivered; Splice Bars, \$1.80 @ \$1.90; Track Bolts, \$2.85 with Square and \$2.95 with Hexagon Nuts.

Old Material—There is an improved demand for all kinds of Old Material, and prices are firmer. We can report sales of No. 1 Wrought Scrap at \$19, net ton; Cast Scrap, \$15, gross; Old Car Wheels, \$19 @ \$20, gross; Leaf Springs, \$20.50, gross; Mixed Scrap Steel, \$16, gross; Short Piece Steel Rails, \$17 @ \$17.25; Old Car Axles quoted at \$23 @ \$24, net ton; Wrought Turnings, \$13 @ \$14.

Detroit.

WILLIAM F. JARVIS & Co., under date of August 13, report as follows: Beyond the strong feeling of certainty that the market is a rising one and cannot long be stationary now that it has commenced in the right direction, there is very little to report in the way of a change from ours of a week ago. Lake Superior Charcoal has been occupying the attention of buyers of that grade to a considerable extent during the past week. Some concerns are complaining that they cannot obtain their regular Irons at the lowest prices, and, indeed some brands cannot be obtained at all. Some large sales have been made, selling the furnaces considerably ahead for all they can deliver during navigation this year. There is decidedly a very much better feeling. With the strength of the Lake Superior Charcoal market Old Wheels very naturally sympathize, and a straight advance of from 50¢ to \$1 per ton, and hard to obtain at the advanced price, can be noted. Southern Iron has cut no important feature here during the past week, but from our Southern correspondents we learn of the continued strength and some advances. Again noting a strong market, quotations to-day will be as follows:

Lake Superior Charcoal, all numbers.....	\$20.00 @ \$20.50
Lake Superior Coke, all ore.....	19.25 @ 19.75
Lake Superior Coke, cinder mixed.....	18.00 @ 18.50
Standard Ohio Black Band.....	19.25 @ 19.75
Southern No. 2.....	17.75 @ 18.25
Southern Gray Forge.....	15.75 @ 16.25
Southern Silvery.....	17.00 @ 17.50
Jackson County (Ohio) Silvery.....	18.50 @ 19.00
Old Wheels.....	19.25 @ 20.00

Chattanooga.

Office of *The Iron Age*, Carter and 9th Sts., CHATTANOOGA, August 13, 1888.

The hopes of Southern farmers are being fully realized in the continuation of favorable weather for the development of their crops, which promise to exceed those of any previous year. Both corn and

wheat in Tennessee exceed in quantity the record of any previous year, and the same may be said of the crops generally throughout the entire South. The effect is already discernable among merchants. Goods of all kinds are being ordered, and holders of bills and notes past due are looking forward to their early settlement.

Pig Iron—Whether or not the better feeling that prevails among the Pig Iron producers has come to stay, there is no questioning the fact that prices have taken a decided upward turn. Sales are being made at the advance with but little higgling. Inquiries are more frequent, and furnace yards are cleaner than at any previous time during the year. Sales are now being made on a basis of \$14.50 for No. 2 and \$15.50 for No. 1, at the furnaces. Inquiries from Boston, New York and Philadelphia have again become quite numerous, and several round lots have been sold to go into those markets. Some five or six of the Southern furnaces will blow out during the present week for repairs, which will simply be letting go for a few days to take a fresh hold when greater results may be expected. Taking everything into consideration, the outlook for the future is certainly on the cheerful side, and everybody is looking forward to much increased activity in business during the balance of the year.

Cincinnati.

CINCINNATI, August 13, 1888.

Pig Iron—The volume of business in the local Pig Iron market during the past week has scarcely been so large as during the preceding week and there has been no further advance of moment in prices, but the market has continued to harden, and the advance established during the past few weeks has been further secured by additional transactions, and, at the close, sellers are disposed to temporarily withdraw from the market on large contracts for future delivery, except at further advance in prices. Buyers, however, are willing to pay the advance already established, but are not disposed to put the market up upon themselves, and therefore less has been done. No. 2 Southern Coke Foundry Iron has been sold at \$16, and there is a report that even \$16.25 has been obtained. No. 1 Mill Iron has been sold at \$14.75 mainly, and No. 2 Mill is quotable at \$14.25 nominally. Lake Superior Iron has sold well and an advance of 50¢ per ton has been realized. There has been less doing in Car-Wheel Iron, but there is still an outlet for all obtainable. At present Mill Iron is scarce and while there is a good inquiry for it, there has been less doing. Ohio Irons have sympathized in the general advance and higher prices have been realized. The market has been less depressed by Softeners and off grades of Iron, and a confident feeling is entertained for the future. There have been no large contracts which have been made public, with the exception of about 7000 tons of No. 1 Southern Mill in St. Louis, which was sold on the basis of \$14.75 here, cash. The following are the approximate quotations for the local market, cash, f.o.b. Cincinnati:

Hot-Blast Foundry.

Southern Coke, No. 1.....	\$16.50 @ \$17.00
Southern Coke, No. 2.....	16.00 @ 16.25
Southern Coke, No. 3.....	15.00 @ 15.25
Ohio Soft Stone Coal, No. 1.....	17.00 @ 17.50
Ohio Soft Stone Coal, No. 2.....	15.50 @ 16.00
Mahoning and Shenango Valley ..	16.50 @ 17.00
Hanging Rock Charcoal, No. 1.....	20.50 @ 22.50
Hanging Rock Charcoal, No. 2.....	19.00 @ 21.00
Tennessee and Alabama Charcoal, No. 1.....	17.50 @ 18.00
Tennessee and Alabama Charcoal, No. 2.....	16.50 @ 17.50

Forge.

Strong Neutral Coke.....	13.75 @ 14.25
Mottled Neutral Coke.....	13.00 @ 13.50
No. 1 Mill Coke.....	14.75 @ 15.00
No. 2 Mill Coke.....	14.25 @ 14.50

Car-Wheel and Malleable Irons.

Southern Car-Wheel.....	20.00 @	23.00
Hanging Rock, Cold Blast.....	22.00 @	25.00
Lake Superior Car-Wheel and Malleable.....	20.50 @	21.00

Manufactured Iron.—There has been a moderate volume of business in Bar, Sheet and Agricultural Iron, and the market has ruled steady. Bar and Sheet Iron—Common Bar Iron, 1.90¢ @ 2¢; Charcoal Bar Iron, 2.90¢ @ 3¢; Sheet Iron, Boiled, Nos. 10 to 27, 2.50¢ @ 3.25¢; Sheet Iron, Charcoal, Nos. 15 to 25, 3¼¢ @ 4¼¢ @ lb.

Nails.—A little firmer tone has prevailed, but there has been only a moderate volume of business, and prices are unchanged. Jobbing prices are based upon 12d @ 40d, which sell at \$2 ¾ keg, with 10¢ rebate in carload lots at mills; 50d @ 60d, 25¢; 10d, 10¢; 8d @ 9d, 25¢; 6d @ 7d, 40¢; 4d @ 5d, 60¢; 3d, \$1, and 2d \$1.50 per keg more. Steel Nails sell at \$2 and Steel Wire Nails at \$2.65 @ \$2.75 ¾ keg.

Old Material.—There has been an increased demand for Old Rails, and the market has continued to rule stronger, with sales of Old Rails reported at about \$20 here. There has been less demand for Old Wheels, and prices have been quotable at \$18.50 @ \$10, cash, here.

New York.

Office of *The Iron Age*, 66 and 68 Duane street, New York, August 15, 1888.

American Pig.—Sellers generally report some falling off in the activity which characterized the latter half of July and the opening of August, and sales have been moderate. There has been no advance in standard brands of Northern Foundry Irons in this market, but the heavier buying alluded to has relieved the pressure existing prior to it and a better feeling does exist. Buyers have largely shaken off their apathy, and are making bids which are closer to sellers' views. We continue to quote standard to choice Northern Foundry, tidewater delivery, \$18 @ \$18.50 for No. 1, and \$16.50 @ \$17.50 for No. 2, with a concession of 50¢ to \$1 for Southern and outside Irons. As yet no freight reductions have been made openly on Southern Irons, but some cutting is expected in the near future, although it may only be of short duration. An interesting feature lately have been the sales of Lake Superior Charcoal Iron in this and other tidewater markets, a sale of 1000 tons at Wilmington, Del., being mentioned among others. These Irons can be laid down at a shade under \$20, while Alabama Charcoal is quoted \$25.85, equal to \$22 at furnace.

Bar Iron.—We continue to quote for carload lots, half extras, on dock, 1.60¢ @ 1.65¢ for Common; 1.65¢ @ 1.7¢ for Medium, and 1.75¢ @ 1.9¢ for Refined.

Structural Iron.—A fair amount of business doing, chiefly in architectural shapes, while in bridge work a 1000-ton order for Oregon, taken lately, may be mentioned. We quote for round lots, on dock: Sheared Plates, 2¢ @ 2.10¢; Universal Mill Plates, 2.10¢ @ 2.15¢; Angles, 2.5¢ @ 2.15¢; Tees, 2.5¢ @ 2.7¢, and Channels and Beams, 3.3¢.

Plates.—We quote for round lots, on dock: Iron Tank, 1.9¢ @ 2¢; Shell, 2.15¢ @ 2.30¢; Steel Tank, 2.25¢ @ 2.3¢; Shell, 2.4¢ @ 2.5¢; Flange, 2.7¢ @ 3¢, and Fire-Box, 3.7¢ @ 4¢. Galvanized Sheets are 65 ¢ @ 65 and 5 ¢.

Steel Rails.—Transactions during the week closed by Eastern mills aggregate about 10,000 tons, the bulk of them for Southern delivery, at least some of them being reported to have been closed at a low figure, tidewater delivery. From the West comes the report of a sale of 14,000

tons to the Union Pacific and allied lines by a Chicago mill, while press dispatches from the Pacific Coast announce the closing of a 30,000-ton contract by the Coast branch of the Moss Bay Company, now building for a new road in that section. There are a few *bona fide* inquiries on the market, not taking into consideration a number of schemes involving long-time payments, with new bonds as collateral, which the Rail mills will not entertain. We quote, at Eastern mill, \$28.50 @ \$29 for large lots, standard Sections.

Merchant Steel.—Manufacturers complain that the season for Sleigh Shoe and Cutter Shoe Steel is exceptionally backward this year. Usually contracts are placed in July and early in August, but thus far buyers have held back persistently, and little business has been done.

A meeting of the Bessemer Merchant Steel Association was held in this city today, the leading mills being represented. It was agreed to maintain present prices and adhere to existing schedules of extras, the point being made that all recent contracts for raw materials had been closed at an advance. The outcome of the meeting puts at rest rumors industriously circulated with an object that a disruption of the association was imminent.

Wire Rods.—We quote \$39.75 @ \$40 for early shipment of foreign Rods.

Old Rails.—Aside from a few small sales no business is reported. We quote nominally \$21 for Tees.

Fastenings.—Spikes are selling in a moderate way at \$2.05 @ \$2.10, delivered, with a stiffening tendency. There is some talk of advancing the price to a minimum of \$2.10. Angles continue 1.90¢ @ 1.95¢ delivered.

Warren, Wood & Co., Boreel Building, Broadway, this city, have been appointed sole agents of McKeefrey & Hofins, lessees of the Leetonia furnaces, Ohio, producing the Seneca brand of Pig Iron.

Financial.

Nothing occurred during the week just closed to dim the brightening prospects of a good fall trade, confidence being strengthened rather than otherwise by later reports concerning the leading crops—wheat, cotton and corn—as well as by the additional evidence that the promised surplus in America will find a ready market in Europe. It is now estimated that the United Kingdom will require the coming year at least 130,000,000 bushels of wheat. A dispatch from United States Consul F. H. Mason, at Marseilles, France, states that the French wheat crop this year is estimated at 250,000,000 bushels, and that the requirements of France from other countries the coming year will be 70,000,000 bushels.

A decision rendered on Monday by Judge Wallace, of the United States Circuit Court, in the case of the receiver of the Bank of Albion against a firm of Wall street brokers, lays down a very wholesome principle. The president of the Albion bank speculated with the bank's funds through the firm of brokers, and the ultimate consequence was the wreck of the bank through his default. The decision sustains a verdict by which the brokers are compelled to refund the money of the bank which they received from the president in payment of his personal obligations. This was received in the form of checks of the Albion bank which showed on their face that they were not personal checks and that the funds which they transferred belonged to the bank, and the brokers knew that the accounts to be settled were the personal accounts of the president. The question is, said Judge Wallace, whether

it was legally right and honest for them to take the checks in question in payment of the personal obligations of the bank officer who made them. * * * Every person who takes such an obligation must ascertain at his peril that the agent who has made it was authorized to do so, and the moment that it appears that the contract has been made for the agent's own use and benefit that moment his authority is impeached. No principle of the law of agency is better settled than that no person can act as the agent for another in making a contract for himself. Therefore it is that a bank president or cashier has no implied authority to bind his corporation to negotiate paper made for his own use, and if it appears upon the face of the paper that it is payable to the individual who has made it in an official capacity the obligation is nugatory and no purchaser can enforce it.

The Stock Exchange markets have been only moderately active, although generally strong. The strangers were somewhat unfavorably influenced by the Government agricultural report. Reading and other coal shares improved. On Monday the entire Oregon group, including Northern Pacific preferred, reflected the advance in Short Line, which was based partly on reports of favorable earnings, which may soon amount to sufficient to relieve Union Pacific of the necessity of meeting its deficit annually, and partly on the prospect of an agreement regarding a division of territory between Union Pacific and Northern Pacific. The Reading buying is believed to have been largely for London houses. On Tuesday the long expected reaction took place and a moderate decline was established, the market closing easy.

Government bonds were firm and are quoted as follows:

U. S. 4½, 1891, registered.....	106¾
U. S. 4½, 1891, coupon.....	107¼
U. S. 4s, 1907, registered.....	127¾
U. S. 4s, 1907, coupon.....	127¾
U. S. currency 6s.....	120

Respecting crops in the United States, the recognized authority in Cincinnati says, corn maintains its favorable position; the oat harvest will fall but little short of previous calculations, and the same of winter wheat, while as to spring wheat a larger production than last year can scarcely be expected. The report issued on Friday by the Agricultural Bureau placed the condition of spring wheat at 87.8, against 78.8 the same time last year, while the condition of corn is placed at 95.5, against 93 last month and 80.5 at the same time last year. The final report of the Indiana Department of Agriculture puts the wheat crop about 32,000,000 bushels larger than that of last year. The Michigan State report indicates about 18,000,000 bushels of winter wheat for the crop, against 16,000,000 last month. New York dry goods jobbers report an improved demand from the South and West, so that now the fall trade in this line may be considered fairly inaugurated. The outbreak of yellow fever at Jacksonville, Fla., will naturally cause some apprehension, but the Government authorities are confident of their ability to maintain an effective barrier. At this port all steamers coming from the yellow fever regions will be subjected to a rigid examination.

Wheat and breadstuffs in this market were dull and quiet until Monday, when there was a decided break, due to an unexpected increase of 2,250,000 bushels in the visible supply, and this despite better cables and bad weather in Europe. Higher ocean freights checked spot demand. The August squeeze in cotton produced an interesting market, the distinctive feature being the receipt of some 4000 bales from Liverpool to supply the "shorts," with more coming. Prices still inclined higher. Sugars are still in a strong position, the receipt of recent pur-

chases exerting little influence. The receipt of three large cargoes of rice from Japan in this port is noted as a novel occurrence. The coal trade is active.

The aggregate exchanges of thirty-eight clearing houses, for the week ending August 11, show an increase of 6.6 per cent. compared with the corresponding period last year; outside of New York the gain was 7.7 per cent. and the improvement was well distributed, although more noticeable in the Northwest—in Duluth, Detroit, Omaha, Denver and Milwaukee. Pittsburgh is 15.4 per cent. and the seaboard cities gain moderately, except Baltimore, which loses 0.6 per cent. St. Paul and Minneapolis are both in arrears.

The weekly bank statement showed a further decrease of \$2,643,550 in the surplus of reserve, which is thus reduced to \$24,106,825. The excess of reserve at the corresponding time in 1887 was only \$4,733,925, and in 1886 \$7,212,225, so that the banks are able to meet the demands which will be made upon them by the South and West to move the crops, and which already begins to be felt. Specie showed a decrease of \$1,734,600. In loans there was an expansion of \$4,087,500. In deposits there was an increase of \$2,198,600. The supply of commercial paper is fair and the demand good. The gross earnings of 39 railroads or systems for the first week in August give an average gain over the corresponding week of 1887 of 5.84 %.

Sterling is heavy and inactive, with posted rates at \$4.85½ @ \$4.88. The Bank of England rate was advanced to 3 %. Anticipating this step, the London *Economist* of the 4th inst., after referring to recent heavy shipments of gold to South America, spoke of the threatened deficiency of the wheat crop in Europe and the consequent necessity of buying more grain in the United States and paying a higher price.

The exports of specie from this port during the week amounted to \$455,300, making a total of \$26,000,000 since January 1, against \$11,612,000 for the same time in 1887; imports nominal. The imports of merchandise at this port during the week were valued at \$7,249,700, of which nearly \$3,000,000 represents dry goods. Since January 1 the total is \$291,898,315, as compared with \$291,752,513 for the corresponding period in 1887 and \$267,315,671 in 1886. The exports for the week were valued at \$4,850,000.

Coal Market.

The Anthracite Coal market continues strong and active, so far as concerns deliveries on former orders, but there is no considerable business doing at the last advance. The tendency of prices is in the direction of a higher range, a subject which is now under consideration, and it is intimated that an advance of 25¢ per ton September 1 is not improbable, simultaneously with an advance in railroad tolls. In official quarters the flourishing condition of the Anthracite trade is spoken of without reserve. Vice-President Holden, of the Delaware, Lackawanna and Western Railroad, is quoted as saying: "The condition of the Coal trade is marvelous, and the demand throughout the entire country is so great that mining is taxed to its utmost. The daily output averages between 130,000 and 140,000 tons, so that, computing 27 working days for August, 3,780,000 tons will be taken from the mines." The actual figures just at hand show that while the production is of steadily increasing volume it is not unprecedented—as yet not quite equal to that of August four years ago. The total output for the week ended August 11 amounted to 831,615 tons, an increase of 76,000 tons compared with the previous week, and 102,000 tons compared with

the corresponding week in 1887. Since January 1 the aggregate is 21,158,567 tons, against 20,744,000 for the same time last year.

It is reported that at Long Branch, on Tuesday, the freight agents of Coal-carrying railway companies had a conference over a proposal to advance their freight rates from 10¢ to 20¢ per ton. There were differences of opinion as to details, but it was agreed that the increased rate was essential and will be put into effect.

Quotations are as follows: Wyoming Free Burning, f.o.b. at South Amboy and Weehawken, Broken or Grate, \$3.85; Egg, \$4.15; Stove and Chestnut, \$4.50; Reading Hard White Ash, Chestnut, \$4.40; Stove, \$4.50; Egg, \$4.25, and Broken, \$4.10. At a meeting of the agents in this city to-day (Wednesday) no change in prices was made.

In Bituminous Coal there is no change. Vessels are scarce.

The Anthracite Coal stock at the Port Richmond terminus of the Reading Railroad now exceeds 100,000 tons and comprises two piles, one of which is 65 feet high and contains 26,000 tons, entirely of Pea. The second pile consists of 15,000 tons of Chestnut. In January the yards were bare.

The Pennsylvania Railroad continues to lead all other roads as the greatest Coal carrier in the country, and already this year the quantity of Coal and Coke originating on the company's lines east of Pittsburgh and Erie exceeds the tonnage of the corresponding period of last year by over 1,000,000 tons. The total tonnage of Bituminous Coal and Coke and Anthracite for the 12 months ending December 31, 1887, was reported at over 14,250,000 tons, while in the first seven months of this year the total tonnage has reached over 9,000,000 tons.

Reading surveyors are engaged in the vicinity of Mahanoy plane locating a site for a great Coal depository. It is said that the management of the Reading Coal and Iron Company is about to begin a system of operations, the purpose of which is to increase the company's output, at the minimum of cost. One of these methods will be the connecting of the underground workings where two mines are located close together, so as to need the operation of but a single shaft and breaker. This plan has been worked with good success for some years past in other Coal fields.

Imports.

The imports of Iron and Steel, Hardware, &c., at this port from August 6 to August 11, inclusive, and from January 1 to August 11, inclusive, were as follows:

Iron and Steel.

	Aug. 6 to Aug. 11. Tons.	Jan. 1 to Aug. 11. Tons.
Iron Ore: A. E. Outerbridge & Co.....	310	310
A. Earnshaw.....	230	6,113
Pig Iron: Crocker Bros.....	573	7,373
Naylor & Co.....	370	5,614
A. Milne & Co.....	100	959
James Williamson & Co.....	100	3,200
N. S. Bartlett.....	100	3,400
Spiegelglas: Crocker Bros.....	334	2,936
Naylor & Co.....	100	5,573
Steel: R. H. Wolf & Co.....	30	342
W. F. Wagner.....	13	1,010
F. S. Pidditch.....	15	236
C. F. Boker.....	12	159½
J. Abbott & Co.....	10	353
Chas. Huggill.....	4	199½
R. F. Downing & Co.....	4	181½
Wetherill & Co.....	3	5
C. W. Power.....	3	49
Newton & Shipman.....	3	115
Steel Rods: Naylor & Co.....	825	13,229
S. A. Galpin.....	250	2,372
Cary & Moen.....	36	625
Iron: H. N. Holt.....	70	70
Steel Blooms: Naylor & Co.....	156	1,912
Steel Billets: A. Milne & Co.....	150	509
Steel Sheets: Pierson & Co.....	19	621
Steel Crop Ends: Naylor & Co.....	226	1,521
Dana & Co.....	202	953
Steel Forgings: Thos. Prosser & Son.....	165	3,222½

Steel Bars: A. Milne & Co.....	56	242
Steel Rails: Delaware, L. and W. R. Co.....	505	1,083
Naylor & Co.....	75	75
Stroud & Co.....	55	55
Steel Tubes: J. S. Leng's Sons	8	42
Steel Hoops: A. R. Whitney & Co.....	146	2,014
Scrap Steel: Naylor & Co.....	94	238
Rivet Rods: J. Abbott & Co.....	301	2,729
Sheet Iron: T. B. Coddington & Co.....	38	915
Swede Iron: Page, Newell & Co.....	15	15
Swedish Rough Bars: C. V. Philp.....	80	169
Steel Billets: A. Milne & Co.....	1	360
Iron Bars: J. Abbott & Co.....	251	253
Iron Beams: W. H. Wallace & Co.....	178	490
R. F. Downing & Co.....	15	239
Iron Pipes: W. H. Wallace & Co.....	5	27
Tee Iron: Stroud & Co.....	26	26
Charcoal Iron: N. Lilienberg.	15	15
Cotton Ties: Naylor & Co.....	1,050	3,404
Bullard & W.....	245	345

Tin Plates.

	Boxes.	Boxes.
Phelps, Dodge & Co.....	18,311	321,728
T. B. Coddington & Co.....	5,967	107,367
Dickerson, Van Dusen & Co.....	3,566	166,306
Pratt Mfr. Co.....	2,523	106,243
A. A. Thomsen & Co.....	1,748	72,418
N. L. Cort & Co.....	1,392	69,006
Hy. Whittemore & Co.....	1,150	40,964
H. R. Demilt & Co.....	668	13,290
G. B. Morewood & Co.....	621	27,310
Bruce & Cook.....	600	65,595
E. S. Wheeler & Co.....	230	3,964
N. & G. Taylor Co.....	160	160

Metals.

	Pounds.	Pounds.
Tin: Phelps, Dodge & Co.....	111,965	1,159,121
American Metal Co.....	44,772	912,376
A. A. Thomsen & Co.....	22,455	122,066
Spelter: American Metal Co.....	55,170	498,169
H. Lamarche's Sons.....	11,212	11,212

Iron and Metals Warehouse from August 6 to August 11, inclusive:

	Tons.
Scrap Iron: Jas. E. Ward & Co.....	60

Hardware, Machinery, &c.

American Carbonate Company, Mach'y, pkgs., 9	
Barbour Bros. & Co., Mach'y, cs., 28	
Baring Bros. & Co., Carpet and Wood Nails, bags, 60	
Bertram Bros., Mach'y, csc., 1	
Boker, Hermann & Co., Mdsc., cs., 42; Hdw., cs., 5; Arms, cs., 28	
Bryce, Wm. & Co., Cutlery, cs., 2	
Canadian Bank of Commerce, Carpet and Wood Nails, bales, 32	
Clark Thread Company, Mach'y, cs., 20	
Clark, G. A. & Bro., Mach'y, cs., 5	
Craden, A. B., Mach'y, cs., 3	
Davies, Turner & Co., Mach'y, csc., 1	
Dolge, Alfred, Mdsc., cs., 7	
Downing, R. F. & Co., Iron Vase, pkgs., 1	
Franklin, Hallett & Co., Hdw., csc., 1	
Feld, Alfred & Co., Mdsc., cs., 9; Hdw., cs., 9	
Folsom, H. & D., Arms, cs., 4	
Fuchs & Lang, Mach'y, cs., 18	
Goyorza, E. & Co., Machine, 1	
Kastor, Ad., Mdsc., cs., 7	
Lau, J. H. & Co., Arms, cs., 15	
New Howe Sewing Machine Company, cs., 117	
Pasnet, J. A. & Co., Mach'y, pkgs., 23	
Sacks & Richmond, Nails, cks., 13	
Shoverling, Daly & Gales, Arms, cs., 37; Mdsc., cs., 10	
Smith, H. Mfg. Company, Mach'y, cs., 3	
Thurman, G. M., Hdw., cs., 6	
Ward, Asline, Mdsc., cs., 3	
Wessels, Geo. & Co., Propellers 2	
Willmerding, Hogue & Co., Mach'y, cs., 5	
Wiebusch & Hilger, Lim., Mdsc., cs., 17	
Williams & Whiting, Vices 6	
Witte, John G. & Bro., Cutlery, cs., 5	
Order: Iron Gate, 1; Crank Pins, 20	

Exports of Metals.

	August 6 to August 11. Pounds.	Jan. 1 to August 11. Pounds.
Copper: J. Abbott & Co.....	1,944,564	10,068,619
Lewisohn Bros.....		3,579,022
F. A. Lomal.....		2,581,298
American Metal Company.....		4,806,140
G. H. Nichols.....		223,959
J. Bruce Ismay.....		112,000
S. Mendel.....		560,000
Ledoux & Co.....		110,276
Muller, Schall & Co.....		490,000
Copper Queen Con. M. Company.....		224,024
J. Kennedy, Tod & Co.....		112,026
H. Becker & Co.....		1,250
Orford C. & S. Rfg. Company.....	225,000	449,831
Robt. M. Thompson.....		125,000
Thos. J. Pope, Sons & Co.....	59,350	622,130
J. Parsons & Co.....		208,250
Bridgeport Copper Company.....		112,000
C. Herold.....		250,000
Phelps Bros.....		6,250
R. W. Jones.....		199,954
W. H. Crossman & Bro.....	4,000	4,000
Copper Matte: Williams & Terhune.....		33,598,077
Lewisohn Bros.....		8,021,510
American Metal Company.....		1,944,941
J. Abbott & Co.....		235,000
C. Ledoux & Co.....		466,800
F. W. J. Hurst.....		184,288
G. H. Nichols.....		722,777
H. T. Nichols & Co.....		180,965
Lead: Sanderson & Son.....	225,024	225,024
Copper Ore: American Metal Company.....	224,000	224,000

Metal Market.

Copper.—Spot Chili Bars in the London market came on Thursday of last week £81. 12/6, giving way in the meantime to £81. 5/ yesterday, while futures remained steady at £78 and good merchantable brands at £78. 10/, sales footing up over there 425 tons. The dealings here have meanwhile been restricted to purchases for syndicate account to the extent of 300,000 pounds spot and August at 16.7¢, the offerings continuing light. For near months 16.65¢ has been bid and for later months 16.50¢ without stirring up the least speculative interest. To-day London advanced with spot Chili Bars to £81. 10/, and with futures to £78. 5/, good merchantable brands declining meanwhile to £78. 7/6. Best Selected has remained steady at £76 in London. The domestic export of Ingot Copper during the fiscal year ended June 30 last has been 25,303,337 lb, against 19,580,023 lb the previous twelvemonth. As per Messrs. James Lewis & Son's, Liverpool, monthly circular of August 1, the visible supply in England and France was 80,616 tons Fine, against 75,169 July 1, 70,431 June 1 and 52,138 tons August 1, 1887; the deliveries were respectively 43,029 tons, 56,397 and 53,749 tons January 1 to August 1 in 1888, 1887 and 1886; the import from the United States into Liverpool and South Wales was respectively 16,530 tons Fine, against 6010 and 9236 tons.

Tin.—Our market has been unsettled by the continual fluctuations in London, where the struggle for mastery has continued, spot opening last Thursday at £92, advancing to £95, and receding to £92. 15/ yesterday, while futures opened at £92. 5/, and, after touching £93. 17/6, came £93. 5/ yesterday; sales 640 tons. To-day London improved with spot to £93. 10/ again, and with futures to £93. 17/6. Here the speculative fraternity have been most of the time about 1¢ apart, so that business came to a standstill at nominally 21¢, spot, and 20.80¢ November. The import of Tin into the United States during the fiscal year ended June 30 last has been 31,690,583 lb, against 29,645,511 lb the previous twelve months, while the re-export was 325,077 lb, against 121,805 lb. **Tin Plates.**—At first active, the market subsided into quietude in view of the erratic course of the Pig Tin market, and, while the main features remain unaltered, the general tone is for the moment one of expectation rather than of action, awaiting further developments. Liverpool has not swerved from 13/6 for Cokes. We quote at the close large lines on the spot: Siemens-Martin Steel, charcoal finish, \$4.85 @ \$5.25; Coke finish, \$4.75; Ternes, \$4.30 @ \$4.40; Bessemer Cokes, \$4.50 @ \$4.60, and Wasters \$4.20 @ \$4.25. The import of Tin Plates into the United States during the fiscal year ending June 30 last has been 634,944,601 lb, against 572,220,397 lb the previous twelvemonth, and the re-export respectively 931,667 and 1,067,299.

Lead.—The main operator has during the week continued his speculative purchases to the extent of 1000 tons Common Domestic at 4.30¢ @ 4.40¢, consumers meanwhile remaining apathetic. As the said gentleman has the local market well under control, however, it remains strong to-day at 4.40¢, while St. Louis is 4.25¢ and Chicago 4.30¢. In London Soft Spanish gave way from £13 to £12. 17/6, at which latter figure it cost 4.80¢, duty paid, to lay it down here. English Pig declined from £13. 5/ to £13. Next month some of our consumers will have to supply themselves. To-day 100 tons of November Lead sold at 4.37½¢ @ 4.35¢, the bulk at the latter figure.

Spelter.—Has been moderately active and firm at 4.62½¢ @ 4.65¢ for Common Domestic, and 5.30¢ Silesian, the latter advancing in London from £16. 7/8 to £17.

Antimony.—Was featureless at 9½¢ @ 9½¢, Hallett, and 13¢ @ 13½¢, Cookson, the former not varying from £39 in London.

New York Metal Exchange.

The following sales are reported:

THURSDAY, August 9.	
50,000 lb Copper, spot.....	16.70¢
200,000 lb Copper, August.....	16.70¢
FRIDAY, August 10.	
25,000 lb Copper, spot.....	16.70¢
10 tons Tin, September.....	21.40¢
MONDAY, August 13.	
16 tons Lead, August.....	4.37½¢
WEDNESDAY, August 15.	
50,000 lb Lake Copper, spot.....	16.70¢
80 tons Lead, November.....	4.35¢
16 tons Lead, November.....	4.37½¢

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, August 15, 1888.

There have been no new developments in the market for Chili Bar Copper. The transactions have averaged light, with but a small portion for the account of consumers, and prices have varied in a moderate degree only. Trading in the new-form contracts has continued large, however, and at a higher range of prices, owing to the general belief that there is less opportunity for "corner" tactics. There is less "outside" Copper offering on the market than for some time past, but stocks are still accumulating on the syndicates' hands.

Pig Tin has ruled very strong under manipulation by the "bull" party, although reacting at intervals when realizing sales were in order. The degree of success with which the "bull" party have carried their point thus far has attracted a considerable following, and there is more than a faint possibility that the leaders have made the most of the circumstance to dispose of a portion of their holdings. Consumers have not figured to any remarkable extent as buyers. Scotch Pig is 6d @ 1/ higher on most brands, Middlesboro' has improved 6d and a similar advance has been made on best brands West Coast Hematite. The manufactured Iron trade has been brisk, with about 5/ advance on common Staffordshire Bars. The Steel Rail market continues firm and business has been done at a slight advance. Blooms, Billets, Slabs and Rods are quiet, however, with values barely steady.

The situation in the Tin Plate market has undergone no particular change. Bessemer sorts are still in active demand, and prices for the same continue to harden. Other kinds meet with only moderate request, however, and barely hold their own in value. Sales have been made at about 3d. advance on last week's prices, in the instance of both Cokes and Charcoals.

The Scotch "warrant" market has weakened somewhat under the influence of pressure to sell, consequent upon the fact that four furnaces have been changed from Hematite to Ordinary Iron. Prices have hardened again, however, owing to renewed demand, attributed to an improved demand for makers' brands, Middlesboro'

and Hematite Pig. Scotch warrants touched 40/ to-day.

The manufacturers of Skelp Iron have formed a combination and advanced prices to 76/ per ton.

There has been more disposition among holders of Old Iron Rails to sell, and business is reported at prices below those generally quoted.

The Landore Siemens Steel Works closed very suddenly. The cause is unknown.

Scotch Pig.—There has been a good business in makers' Iron and prices have hardened.

No. 1 Coltness, f.o.b. Glasgow.....	48/6
No. 1 Summerlee, " ".....	48/6
No. 1 Gartsherrie, " ".....	48/6
No. 1 Langloan, " ".....	48/6
No. 1 Carrubroe, " ".....	41/
No. 1 Shotts, " at Leith.....	46/
No. 1 Glengarnock, " Ardrossan.....	44/
No. 1 Dalmeilington, " ".....	41/6
No. 1 Eglinton, " ".....	40/

Steamer freights, Glasgow to New York. 6/; Liverpool to New York. 7/6.

Cleveland Pig.—Prices have advanced and the market is strong with a good business. No. 1 Middlesboro', G.M.B., 35/9; No. 3 do., 33/3.

Bessemer Pig.—Transactions have been liberal and the market is very firm. West Coast brands, mixed numbers, 44/, f.o.b. shipping point.

Spiegeleisen.—There is still a good demand, and prices remain firm. English 20 % quoted 80/, f.o.b. N. W. England shipping point.

Steel Rails.—The market very steady and demand fairly active. Standard sections quoted at £3. 18/3, f.o.b. at N. W. England shipping point. Middlesboro' district 2/6 less.

Steel Blooms.—Quiet market and no material change in prices. We quote at £3. 12/6 for 7 x 7, f.o.b. at N. W. England shipping point.

Steel Billets.—Values a shade lower business fair at the decline. Bessemer, 2½ x 2½ inch, £3. 17/6, f.o.b. at N. W. England shipping point.

Steel Slabs.—The demand moderate, but prices steady. Bessemer, £3. 17/6, f.o.b. at N. W. England shipping point.

Steel Wire Rods.—Prices about steady and business moderate. Mild Steel No. 6 quoted at £5. 16/ and No. 5 at £5. 14/, f.o.b. at N. W. England shipping point.

Old Rails.—More pressure to sell and values are somewhat unsettled. Tees quoted at £2. 17/6, and Double Heads £2. 18/9, c.i.f., New York.

Scrap Iron.—Supplies firmly held but demand slow. Heavy Wrought quoted at £2. 7/6 @ £2. 10/, f.o.b.

Crop Ends.—Holders are firm but sales are moderate. Bessemer quoted £2. 5/ @ £2. 7/6, f.o.b.

Tin Plate.—There has been a good business and the market is strong. We quote, f.o.b. Liverpool:

IC Charcoal, Allaway grade.....	14/9 @ 15/3
IC Bessemer steel, Coke finish.....	13/3 @ 13/6
IC Siemens " ".....	13/6 @ 13/9
IC Coke, B. V. grade.....	13/ @ 13/3
Charcoal Terns, Dean grade.....	13/ @ 13/3

Manufactured Iron.—The general market strong and fairly active. We quote, f.o.b. Liverpool:

Staff. Ord. Marked Bars....	£ s. d. @ 7 10 0
" Common " ".....	@ 5 0 0
" Blk Sheet, singles ".....	@ 6 15 0
Welsh Bars (f.o.b. Wales)....	4 12 6 @ 4 15 0

Tin.—The market very firm. Straits quoted at £93, spot, and £93. 15/ @ £93. 17/6 for three months' futures.

Copper.—Market quiet and unchanged. Chili Bars, £81 @ £81. 5/, spot, and £78 @ £78. 5/ three months' futures. Best Selected, £75. 5/ @ £75. 10/.

Lead.—Weak market, with business slow. Soft Spanish, £12. 10/ @ £12. 15/.

Spelter.—The market stronger and more active. Silesian, ordinary, £17.

Cleveland.

CLEVELAND, August 18, 1888.

Iron Ore.—The total shipments, by both rail and water, to date, slightly exceed 2,150,000 tons, the best authorities now placing the year's output at that figure. Sales for the past week have been confined to scattering, and in some cases special, lots at figures scarcely indicative of the true condition of the market. Prices for all grades of Ore are firmer because of the slowly advancing lake freights. The Chapin Mine has made additional sales of Ore at \$5, and will ship altogether over 200,000 tons of Ore this season. The following are f.o.b. cars Cleveland quotations:

No. 1 Specular and Magnetic Bessemer Ore.....	\$5.50 @ \$6.00
No. 1 Specular and Magnetic Non-Bessemer Ore.....	4.75 @ 5.00
Red Hematite Bessemer Ore.....	4.50 @ 5.00
Red Hematite Non-Bessemer Ore.....	3.50 @ 3.75
Menominee Range Bessemer Ore.....	4.75 @ 5.10
Menominee Range Non-Bessemer Ore.....	3.50 @ 3.75
Gogebio Range Bessemer Ore.....	4.75 @ 5.15

Pig Iron.—Steady sales are doing much to clear the market up closely to production. Several instances are reported this week of orders for round lots having been declined, the seller not having the iron on hand. Dealers report a firmer feeling and look upon the situation very hopefully. It is believed that quotations cannot fail to advance within the next ten days. Mill Iron is in especial good demand at present, and Foundry Iron, both hard and soft, is selling freely. The sale of 2000 tons of No. 1 Foundry at \$16, f.o.b. cars, delivered, is reported.

Scrap Iron.—The market is lifeless, Old American Rails being offered at \$20 and Old Wheels at \$18.50.

Nails.—Steel Wire Nails at \$2.50 per keg seem to have usurped the market, very little being done in Steel Nails at \$2, or Iron at \$1.90, beyond a few stock sales.

Sheets.—No. 24 is now quoted at \$2.75. Special shapes are in excellent demand.

Manufactured Iron.—Common Bar is selling from store at 1.65¢, with only a moderate inquiry.

A fire in Pittsburgh, yesterday morning, destroyed the machinery in mill No. 2 of the French Steel Spring Works, on Liberty and Twenty-first streets. The loss will not exceed \$25,000, and is covered by insurance. The fire started from an overheated smokestack.

The New Ore Discovery Near Marquette.—Since the opening of the Negau-nee, Buffalo, South Buffalo, Sam Mitchell and other good mines in the so-called "East range" two years ago some desultory exploring has been done further to the east. Among those who did more or less work at Morgan, half way between Marquette and Lake Superior, was Wm. P. Healy, of Marquette. He secured an option on the N. W. quarter of the N. E. quarter of section 6, township 47, range 25, north, from Pittsburgh & Lake Superior Iron Company, which owns some 30,000 acres of land in the mineral belt of the country. He gave up the option after spending a great deal of time and money, and work was continued by the owners of the property where Mr Healy left off. A diamond drill was put at work, and 45 feet of clean ore Bessemer quality was passed through,

and the drill was still in ore. Ralph Bagley, G. I. Whitney, J. N. Lippencott, C. Yeager and the heirs of John Deens are among the Pittsburgh parties interested in the discovery.

Zapon Enamel.

A lacquer or enamel known by the name of "Zapon" is being put upon the market by the Frederick Crane Chemical Company, Short Hills, N. J. In referring to its merits, the manufacturers compare it with the ordinary lacquer generally used on metal work, and point out in what particulars it is superior to the common article. In the first place, it is said that when scratched it does not show a white mark, but leaves a clean cut, the same as if a surface of metal were scratched. It is also said to be extremely hard, besides remaining unaltered by dampness, moderate heat or vapors. The perfection of the work, as with ordinary lacquers, is largely dependent upon the care exercised in applying it, and it will, therefore, be of interest to present the following description of the method of its application furnished by the manufacturers:

The article to be coated is made perfectly free from grease, dirt, lint and moisture, and should be at a normal temperature, for, if cold, the zapon will thicken more readily in the hollows, and some grades would show chalky white streaks; also, more material would be used, and, on account of the thickness above mentioned, it would be more difficult to produce a perfect coating. On the other hand, if the metal is too warm, the zapon will set too quickly, and will not have sufficient time to spread or flatten itself out; further, a high degree of heat would be apt to turn the collections in the hollows and at the lower edge of the article a light yellow or brownish tinge. It is recommended, therefore, that the metal, as well as the zapon itself, should be at the temperature of an ordinary working-room, though, when skill is attained, the temperature may be run up to 100° or more, where it is necessary to push work through rapidly.

The manufacturers have patented a combined drip rack and drying closet, which they send out complete, with the exception of the steam coils for heating, which are generally put in by the machinist of the factory to which the rack goes. For convenience of shipping the rack is made in sections, and is shipped knocked down. It consists of the following parts: Four sections, which in pairs form the sides of the rack; the fifth section is placed over rests upon the sides, forming the top; two swinging doors close the rear end, and a sliding door divides the drip rack from the drying closet; this sliding door is furnished with ropes and sash rollers, and works like a sash in guides. Two strips placed about a foot from the floor on the inside of either side serve to hold the two sections together; two other strips, placed in the same manner about 6 inches below the top, serve the same purpose there. This second pair of strips carry a series of rollers placed about 4 inches apart on the upper side of the strip. A series of blocks about 1 inch square and 8 inches long rest on the rollers, and passing from the center of the block on one side across the rack to the center of the block opposite is an iron rod, and so with the other pairs of blocks in the same way through the whole length of rack. These rods are for hanging the work upon after it has been dipped.

A wooden case or tank, lined with tin, and having a deeply flanged cover, is placed at the front end of the rack; this tank is usually 8 inches to 1 foot in width, 2 feet deep, and as long as the rack is

wide, and rests upon a shelf placed about 1 foot from the floor and reaching from side to side of the rack. This brings the top of the tank 8 feet from the floor, which is a comfortable working height. Into the tank is poured enough zapon to cover the average of the articles intended to be dipped, and usually this makes it about one-half full, it being made so deep to prevent unnecessary evaporation by the passing of drafts or currents of air across the surface of the liquid. The article to be zaponned being hung upon a suitable hook and in a way which experience alone can dictate, is dipped into the liquid and immediately hung upon one of the iron rods above described, which has been placed immediately over the tank. The second article is dipped and hung up in the same manner, and so on until the rod is full; care being taken not to have the pieces so close together that they will strike each other or the sides of the rack, and be marred thereby. When the rod is full the sliding door is lowered sufficiently to allow the rod to pass beyond it with its burden, the pieces having by this time ceased dripping, the rollers above described reducing the friction as the rod is pushed back. The sliding door is raised to its position or goes up by the aid of weights. The second rod is placed in position over the tank, other articles are dipped and hung as before, and this rod, when full, is pushed back like its fellow, and so the process proceeds until the closet is full, when the rear doors may be opened and the rod first put in may be removed if the articles hanging upon it are sufficiently dry, as will usually be the case.

If a boy is employed to remove the articles, the man or boy doing the dipping may proceed with his work without intermission. If work is being pushed rapidly the zapon is not allowed sufficient time to take up its own drip—that is, the little collection at the bottom of the article, where the last two or three drops gather, and to overcome this the finger may be applied to the drop before it has become set or stiffened, and in this way most of it will be removed. As the zapon is used it will evaporate somewhat, especially from the drops falling from the articles freshly dipped, and to prevent its becoming too thick a special diluting liquid is added from time to time, as experience dictates, and thoroughly stirred in. Where large tanks are used it is found necessary to do this only once or twice a day—say at noon when work stops, and at night. The time thus allowed for the liquid to remain undisturbed being an advantage. If care is used not to allow dirt, rouge, lint or other foreign matter to get into the zapon, and if the tank is tightly covered whenever not in use, the material, it is said, may remain in it for weeks without detriment, but if through carelessness it becomes soiled, simply standing it aside for a few days or weeks and using a fresh lot enables the foreign matter to settle, when the zapon may be decanted, and will be found as good as at first. Rouge, however, or other coloring matter cannot thus be removed.

There are now being constructed in the Canadian Pacific Railway shops, at Hochelaga, 40 locomotives which will have an average weight each, with tender, of 157 tons. The cylinders are 18 inches in diameter and have a 22-inch stroke. Each engine will have six driving wheels, and the steam pressure will be 180 pounds. They are for use in the Rocky Mountain section of the Canadian Pacific Railway.

The managers of the Penn Rolling Mill, of Lancaster, Pa., have posted a notice that the mill will suspend indefinitely owing to dullness in the iron trade.

Hardware.

The demand for Hardware shows a considerable improvement, and stocks of goods in manufacturers' hands are becoming light, so that it is sometimes difficult to get prompt shipments. While there is no considerable advance, nor in fact any changes in prices worthy of mention, a firmer feeling is steadily gaining among manufacturers, owing largely to the firmer tone of the metal market.

Cut Nails.

There is more inquiry. Sellers are firmer, and do not give way as easily as they have hitherto done. There is still some cutting, but the tone is better, with \$1.85 a bottom figure for large purchases of standard Nails. We quote \$1.95 to \$2 from store for Iron and Steel Nails. The last statistics of the Atlantic States Nail Association show an unusually light product in July, the sales, too, being small in volume.

It is a matter of comment in the Northwestern Hardware trade that Iron Nails now seem to have no standing whatever. For a long time after the introduction of the Steel Nail it was found necessary by jobbers to carry stocks of both kinds of Cut Nails to meet the views of customers in different localities. The situation was then further complicated by the introduction of the Wire Nail, and the rapidly increasing trade in it. Partly through the breaking down of prejudice against the Steel Nail on the part of consumers, and partly through the efforts of jobbers to rid themselves of an undesirable addition to their stock, the consumption of Iron Nails has been so heavily curtailed in the section referred to that when Nails are now called for it is taken for granted that Steel nails are meant. Iron Nails must be asked for specially if they are desired, and it is then a matter of some difficulty to get them, as many jobbers absolutely refuse to keep a stock of them on hand. Steel Cut Nails and Wire Nails must both be carried in stock in full assortment, and dealers believe the Nail trade is sufficiently cared for in that way. The Wire Nail is still gaining on the Cut Nail to some extent, the rural trade of the Northwest being inclined to prefer Wire Nails, the proportion in extreme cases running up to 60 per cent. of the total Nail sales.

Wire Nails.

The market continues quiet, and values are unchanged, with small lots of base sizes selling from store at \$2.45 to \$2.60. The proposed combination, referred to in a recent issue of *The Iron Age*, has met with opposition from one leading mill, which declined to enter it. For the present the plan is therefore in abeyance.

The Cordage market continues very firm, and it now looks as if the manufacturers would soon have complete control of the market. Prices remain steady at the figures given in our last issue, but buyers seem to be unwilling to make orders at the sharp advance there noted. The amount of actual transactions has, therefore, been small. Some of the jobbers, both in the East and West, are offering Cordage at concessions from the manufacturers' prices.

We have received from A. Roesler & Co., Warsaw, Ill., a circular announcing a reduction in the price of their Black Luster Stove-Polish Paste. They now offer it in cans for dealers' use at 15 cents per pound, or 75 cents per can, and in boxes for family use 60 cents per dozen, or \$7.50 per gross. We are informed that the trade in this article is rapidly increasing, and that, having increased their facilities for manufacturing, they are enabled to offer the polish at reduced prices.

Hibbard, Spencer, Bartlett & Co., Chicago, have issued a circular of Campaign Goods, adorned with cuts with the gorgeous coloring befitting such a line. Among the articles shown are a great variety of Lamps, Torches and Lights; Hats, Caps, Helmets; Enameled Cloth Capes, Coats, &c.; Shirts and Suits of Flannel, Duck and Oil-Cloth, patent Collapsible Transparencies; various instruments of vocal torture under the heading of "Noise in any shape"; Flags and Banners of various kinds; Grand Army Drill Equipments, and ending with three pages of Fireworks. Hibbard, Spencer, Bartlett & Co. are making great preparations for this trade, in which they claim to be headquarters, and have a line of goods which will do much to prevent this "campaign of intellect" from being too monotonous.

The Witte Hardware Company, St. Louis, have issued a large and handsome catalogue of 865 pages, showing the goods they keep in stock, with the manufacturers' price lists, and fully illustrated. The goods included embrace a full line of the goods usually found in a hardware store, arranged in departments as follows: Mechanics' Tools and Farming Tools and Implements; Builders' Hardware; General Hardware; House Furnishing Goods; Stamped, Granite and Hollow Ware; Guns, Pistols, Ammunition, Sporting Goods, Skates, Ice Tools, &c.; Cutlery. The book is substantially and handsomely bound, and will prove very serviceable to the trade.

Mast, Foos & Co., Springfield, Ohio, have rearranged and made some novel additions to their exhibit at the Centennial Exposition at Cincinnati, chief among which is an exact duplicate of their Iron Turbine Wind Engine, which, by means of a current of air supplied some distance therefrom, is made to move and operate in a most realistic manner, the cause of its movement not being readily apparent, proving a constant source of wonder to the visitors, while Force Pumps and full-sized Wind Engines are also made to operate by means of concealed gearing located beneath the platform upon which they stand. Highly finished specimens of the Buckeye Senior and Junior Lawn Mowers, Wrought Iron Fencing, Cresting, &c., complete the exhibit.

The Udell Woodenware Company, A. A. Barnes, proprietor, Indianapolis, Ind., exhibit a very attractive and comprehensive display of their productions of Woodenware, chief among which are the Udell Step and Extension Ladders, Blacking Cases, Folding Tables, Wall Cabinets, Commodes, Hat and Coat Racks, Rope Reels and Broom Stands.

The Bromwell Brush and Wire Company, Cincinnati, exhibit an interesting collection of their productions, consisting of Brushes of every description, Turkey and Feather Dusters, Bird Cages, Fly Traps, Wire Cloth Sieves, Corn Poppers, Barbed Wire, Wire Rope, &c.

The Gooch Freezer Company have on exhibition a very large assortment of their well-known Peerless and Giant Ice-Cream Freezers, ranging in sizes from 3 quarts up to 42 quarts each.

Schenck's Adjustable Fire Back Company, of Chicago, report a rushing business in Bolt and Screw Cases. Last week they shipped six large cases and six flower stands to Australia via Boston, and on the same day sent three cases to Portland, Ore. Other shipments embrace two orders of three cases each to North Carolina and an order of something less than a carload to the Pacific Coast. On cases for Hardware jobbers' use as a sample in their stores the company are offering a special discount.

The Fred. J. Meyers Mfg. Company, Covington, Ky., inform us of the death of Mr. W. R. Spofford, who died on the 5th inst. at Pine Bluff, Ark., while traveling on their business. He was an exemplary young man, and his death will be regretted by all who knew him.

The advertisement of Woodruff, Miller & Co.'s Mount Carmel Ox Shoes on page 75 is worthy the attention of all dealers in this line of goods. Their Steel Toe Calk Ox Shoes have met a largely increased demand during the past 10 years among all classes of shoers, and the manufacturers inform us that their claims that they are better adapted to general shoeing and will outwear any other Shoe are supported by hundreds of testimonials from shoers in every part of the country. Besides the patterns shown in the advertisement, they make to order any size or pattern that may be desired. The same Shoes can be furnished at a lower price if the Toe Calks are not converted into steel. The manufacturers would be glad to enter into correspondence with any of the trade who are not handling their goods.

Jacob F. Knorr, an old and well-known resident of Orange, died suddenly in the Hoboken ferry-house on the 9th inst., while on his way to his office in New York. Mr. Knorr was born in Philadelphia in 1808, and lived there until the war broke out, he having amassed a large fortune in the Hardware business. As most of his trade was in the South, the war brought reverses to him and he removed to New York, where he founded a company, of which he was still president at the time of his death. His office was at No. 49 Murray street.

The Morrill Saw-Set Company have been incorporated with a capital of \$10,000.

In an advertisement on page 49 will be found the decision of Judge Andrews of the Supreme Court in this city of application for the counter injunctions between Baeder, Adamson & Co. and the Baeder Flint Paper Company, involving the use of the word "Baeder" as a trade-mark. The decision was in favor of the latter company in both cases.

J. Jacob Shannon & Co., 1744 Market street, Philadelphia, have issued a very handsome catalogue and price list of Builders' Hardware exclusively. This book, of 292 pages, which is very finely printed and well bound in cloth, will, we are informed, be placed in the hands of nearly every builder in the United States, as well as some in foreign countries. We have seldom seen a book better adapted to its purpose or more creditable to all concerned in its preparation.

The Taylor & Boggis Foundry Co., of Cleveland, Ohio, have bought the Kidder Slide Door Hanger patent and patterns and good will of the business. This will involve no change in the manufacture of the goods, which have all been made by them for the past seven years. They promise to keep constantly on hand a large stock of both sizes, that orders may be promptly filled, and to fully maintain the quality of the goods.

Among our Special Notices will be found the announcement of Haydock & Bissell of a special trade sale on Wednesday and Thursday, August 29 and 30, of miscellaneous Hardware, including 500 cases Philadelphia Screw Company's Flat Head Iron and Brass Screws, to be sold by the case only.

The copartnership existing between H. N. Henderson and L. A. Harker, of Columbus, Ohio, under the firm name of the Henderson & Harker Mfg. Company, has been terminated, and the business

transferred to a stock company under the title of the Henderson, Harker & Hayden Mfg. Company, of which Mr. H. N. Henderson is secretary and L. A. Harker superintendent, Mr. Henderson being authorized to settle all copartnership matters. The new concern will continue the manufacture of the Columbus O. K. Stove Pipe Elbows, Get-at-able Rain-Water Cut-Offs, and "H. & H." Gas Soldering Furnaces, together with a variety of other articles formerly made by the old concern.

The Union Indurated Fibre Company have been successful in the introduction of their Indurated Fibre Pipe for electrical work. We are informed that the Bell Telephone Company, of Philadelphia, are laying some 7 miles of this Pipe, and we understand also that large contracts are in negotiation with a leading Eastern railroad for this Pipe for underground systems of telegraph. The Union Indurated Fibre Company are furthermore introducing their ware for battery jars, and mention a number of orders for this purpose that have been awarded them.

Overbuying in the Retail Trade.

In one of our exchanges, representing an important line of trade, we find some very pertinent remarks, which seem to apply with equal force to other lines of retail trade. The writer referred to, in searching out the cause for so many failures in the dry goods trade, comes to the conclusion that it results from buying more goods than can be profitably disposed of. In former times merchants with small capital, as a rule, prospered and built up a large business. They very rarely allowed themselves to acquire a larger stock of goods than they could conveniently handle, and keeping their business well under control were in a position to see their profits in a more tangible form than the stock of goods in store. Nowadays, says our exchange, when a merchant is in trouble, and has made no outside speculations, he will be found almost invariably with a large stock of goods on hand. The same has been slow in sale, bills have matured, and as all his money is invested in the stock he is compelled to make an assignment. Overbuying is the rock on which he splits.

The moment the retail merchant gets to doing a trade of forty, fifty or one hundred thousand dollars a year he wants to buy direct from the manufacturer or the manufacturer's agent in quantity, instead of purchasing from the jobber in smaller packages from time to time as the needs of his trade require. Suppose he does buy from the manufacturer or his agent and saves 10 or even 15 per cent., the latter as a rule will force him to buy five times the amount of goods that the jobber can usually sell him. He takes the goods home and places them on his shelves, and then finds out that he has five pieces of an article where one would have been sufficient for the demands of his trade. This is probably true of almost his entire stock, and very likely in high cost goods. The consequence of this is he has accumulated a large stock which he cannot sell, and his capital is not only wrapped up in the same, but he also owes for a good part of it besides. On the other hand, probably he has a bright young merchant of his town as a competitor, who goes to market often, and buys of the jobbers one piece of a color, who probably pays 10 or even 12½ per cent. more than the former does. The latter takes his goods home and sells them, and has his capital in the drawer, but the other merchant has all his capital wrapped up in old stock on his shelves, and is worried to death to meet maturing bills to pay for goods which he cannot sell. This has been the cause of more failures in the retail trade than probably anything else.

Arrangement of Stores.

The diagrams which we give below represent the arrangement of the store of Moore, Moore & Handley, Birmingham, Ala., wholesale and retail dealers in Hardware, Machinery, Railroad and Builders' Supplies, who have recently moved into their present quarters, which for convenience and completeness of arrangement are highly spoken of. There are two trunk railroads at one end of the store, a street at the other, while there is an alley on one side and a light court on the other, extending about half the way back. The ends of the building from bottom to top are described as consisting of doors and windows, so that altogether the house is as

bars 1 inch iron. In its nine tiers there are 144 compartments. The stock ranges from ½ x ½ and ¾ round to 1 x 7 inches, 2½ round and 3 square.

The Axle and Skein rack, being 8½ feet high, also in two tiers, has 81 bins, 56 on the Axle and 25 on the Skein side. Machine Bolts are stacked in the southeast corner of the room in cross layers just as they come. This arrangement has been found much more convenient than bins. In the Horseshoe and Nail department, Fig. 258, there are two tiers of 17 bins each. The Horseshoe tier is on a level with a base shelf 24 inches from the floor and 21 inches deep, upon which a 240-pound Boston Grocer's Scale runs on an iron track, as shown in cut. The Nail

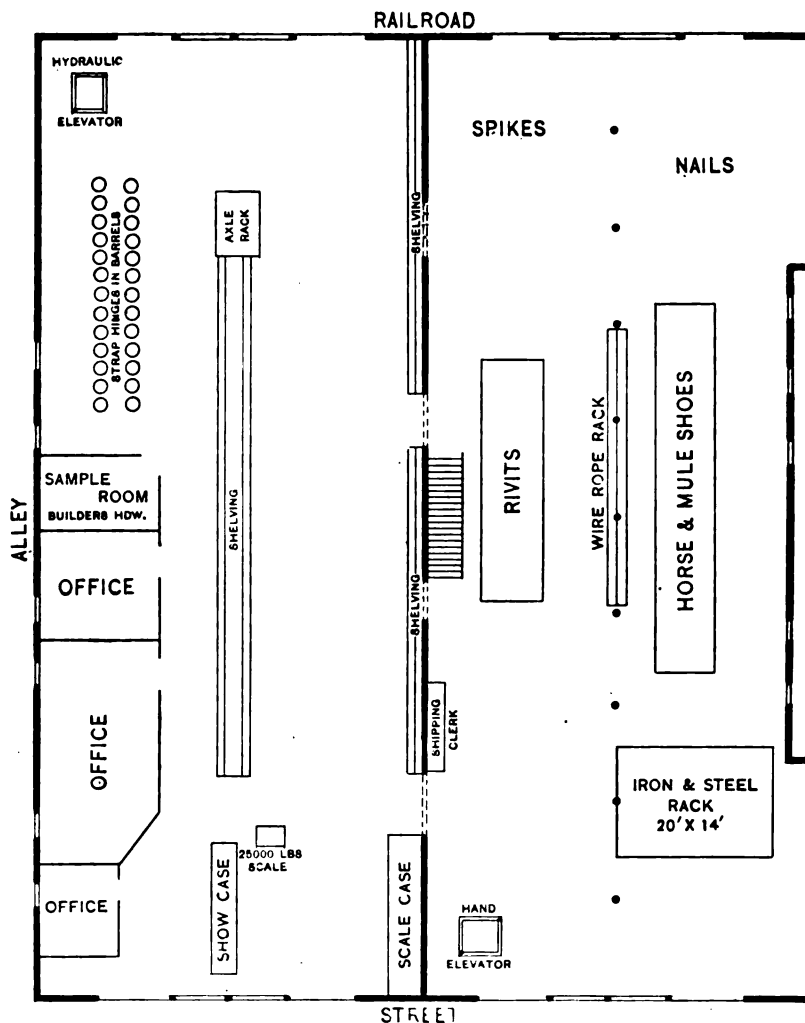


Fig. 258.—Moore, Moore & Handley's Store.—First Floor.

well lighted as possible. We give diagrams of the first and second floors, which show the principal features of arrangement.

The fixtures and furniture are of the most approved design, and are well finished and attractive in appearance. The shelving is adapted to the stock and equipped with Morley Brothers' Railroad Ladders. The goods are received at the railroad end of the house, and in case of need raised to the second and third floors by means of a hydraulic elevator. Shipments are made mostly from the street front, where the hand elevator does service between the floors.

It will be seen that the extremes of the heaviest goods in the house and the shelf goods meet on the first floor. The Iron and Steel rack, which, being secured to both floor and ceiling, strengthens the building materially as well as stores the goods in the smallest possible superficial compass, measures 20 x 14 feet. Its estimated carrying capacity is 800,000 pounds. Its uprights are 4 x 6 timbers and cross-

tier is 16 inches above, convenient to the scoop. The Nails are raked into this from the bins, and, having been weighed, are poured into paper sacks, so that they do not need to be handled at all. Crosscut Saws are kept in a rack of nine compartments, 8 feet high, and Shot in a three-tier rack of 18 compartments. All the shelving is movable, besides being adapted to every kind of stock.

The second floor is given up largely to Shovels, Picks, Spades and knocked-down Barrows, and of goods of this character a very large stock is carried. The Shovel, Spade and Pick rack is 6 feet high and is built in two tiers. The Belting and Packing racks are merely a succession of single bars of round iron as axes for the rolls to turn on. The Tackle rack is two rows of bars, six high, reaching to the ceiling. On the third floor is the Spoke rack, which also has two tiers and contains 22 bins.

The excellent display of samples is a notable feature of this establishment. The north wall of the second floor sample

room, 9 feet high, is covered with a great variety of samples from a Circular Saw down, and, being some 15° out of perpendicular, shows them to the best advantage. Across the middle of the room runs a show case, 6 x 29 feet, supporting a two-sided baize-covered frame covered with small shelf goods. The case, which is rather a succession of small cases on either side of the frame, is just deep enough to hold small fancy articles that need to be protected from the dust. Parallel with and 3 feet from the wall is a set of Shelves for Scales. This shelving is 29 feet long. On the lower shelf, 6 inches from the floor, Platform Scales are carried. On the next, which is the height of the pillar of a 1200-pound Scale, Union and Grocers' Scales are accommodated, and on the next,

until on a perpendicular they stand edge to edge out of the way, and leaving the two sides of the shaft absolutely unobstructed from floor to floor. This latter point is referred to as a considerable advantage over the wiring and doors which usually do the same service. The economy of the contrivance is also alluded to, as the latter method for two elevators would cost, it is estimated, some \$300, whereas the contrivance in use is referred to as costing less than \$10.

When Trade is Dull.

The duty of the merchant or manufacturer at such times, says a recent issue of the *Dry Goods Chronicle*, is to create business by offering new and attractive styles, by seeking new customers and pushing

present is a good opportunity to try the experiment. Business is dull in midsummer and you have goods to sell. Let the public know it through the columns of an influential journal, and your wares will soon find a market.

Signal Service Reports.

In one of our exchanges we find the following, which will be of interest to all those in the retail trade who are on the alert for opportunities to display business enterprise:

In small towns where no signal service stations are located the United States Government will furnish daily weather reports to the first responsible party who will apply, and agree to erect a staff and display the signals. The staff need not be a very expensive affair, and the flags cost from \$6 to \$12 according to the quantity. In places of any size the Government furnishes the service positively gratis, and where it is impracticable for the United States to bear the expense only the bare cost of the telegrams at 1 cent per word is made. As will be plainly seen, it is a

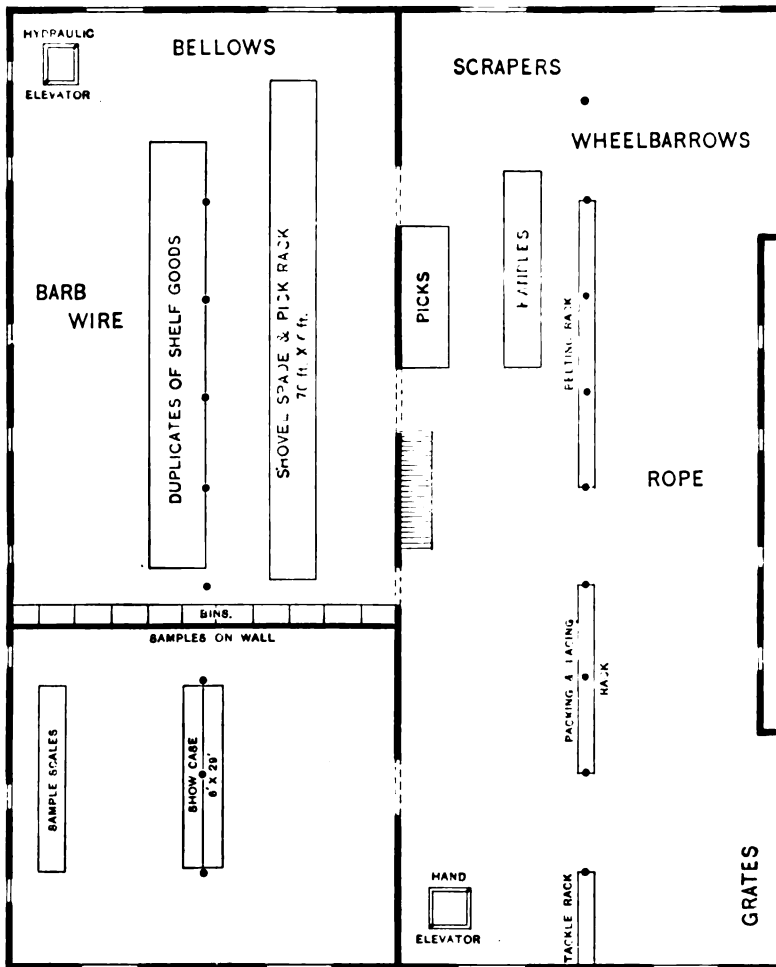


Fig. 259.—Moore, Moore & Handley's Store.—Second Floor.

which is the height of the top of the scoop of a Union Scale, are Trip Scales. On the other side of the sample room are six counters running at right angles with the central sample cases, which, however, are not shown in the diagram.

In the Scale case on the first floor 20 styles of Fairbanks' Platform or Counter Scales are displayed, the small styles being arranged on two shelves at a convenient height. Immediately in front of it is arranged a line of sample Macneale & Urban Safes, for whom they are agents. They are also agents for Bates's Hand Elevator, one of which they have in use, as shown in the diagram. The hydraulic elevator is of the Hale make. The method adopted for protecting the well holes is alluded to as especially satisfactory. The device is the result of the ingenuity of one of their employees. Each opening is merely fenced to the height of 3 feet 6 inches, with strips of dressed pine. On the gate sides the strips are loose at one end where a slot receives them as they descend, and being merely bolted to a cross piece in the middle, approach each other as they ascend

beyond usual neighborhood limits. He should not sit down and wait for trade to come to him, but seek it on every side and through the use of every lawful instrumentality. When trade is dull a more active exertion must be made to secure it than when the business is brisk. When times are flush and money is plenty it requires but little effort to sell goods. There is not so much need of advertising at such times. The test of business ability is shown in periods of depression, when nerve, pluck and energy win the day. The bold, aggressive merchant then comes to the front, and, while the great majority of the dealers are timid and hesitating, he uses the columns of the newspapers, and to great advantage. By this policy he turns the retreat of others into a victory for himself; he attracts public notice and draws trade from every quarter. New advertisements attract far more attention in a stagnant market than when trade is at full tide. They indicate life and spirit in the midst of depression. They catch the public eye and win a new support. Shrewd merchants always advertise most in such periods. The

Fig. 260.—Horseshoe and Nail Counter.]

splendid advertisement; not only does it attract almost constant attention to your place of business, but you may have the signal code printed on your business cards for free distribution among your customers, and you will get much free advertising in the newspapers in return for the use of your dispatches. The cost is comparatively light, and it takes but little time to attend to the signals. Communications in reference to the display of these signals should be addressed to A. W. Greely, Chief Signal Officer, Washington, D. C., and the flags may be obtained of George B. Carpenter & Co., 202-208 South Water street, Chicago.

In their advertisement on page 81 it will be seen that Sidney Shepard & Co., Buffalo, N. Y., and C. Sidney Shepard & Co., Chicago, Ill., illustrate their Buffalo Dampers and Buffalo Damper Clips. These goods are alluded to as having black enameled wood handles and as requiring only one hole in the pipe. Their simplicity and excellence are also referred to.

A dispatch from Toledo, Ohio, under date of the 8th inst., reads as follows: "Not since natural gas was turned on in this city by the two gas companies practically under Standard control have the people been satisfied with the prices charged, especially to manufacturers. For a long time a movement has been quietly under way looking to the organization of a citizens' independent line. That movement has been very successful, over 150 prominent citizens having subscribed. The company will be incorporated to-morrow, and will be known as the Citizens' Natural

Gas and Trust Company. The capital stock has been fixed at \$100,000, and is nearly all taken."

Recent Legal Decisions.

TELEGRAPH COMPANY—MESSAGE NOT SATISFACTORY.

L. received a telegram from A. giving him a quotation of sheep as "Five six," and as he thought that a strange price he went to the operator and requested him to ask A. whether the quotation was "five six" or "five sixty," and then the operator, in due time, said to him that he had asked, and that the message "Five six" was correct. Then L. sold the sheep at \$6 each by the hundred, after having given A. an order to buy and ship the number he sold at \$5.06. There was no payment made for the repetition, and no demand for payment was made. L. had account for messages with the company which was paid at stated times, but no charge for repeating this message was made in the account. L. demanded his loss of 54 cents on each animal, but the company refused to pay on these grounds: 1. That no payment was made for repeating the message. 2. That the message was not definite enough to show the operator its importance. 3. That as L. had sold the sheep for a greater price than he had paid for them he had suffered no loss. L. then sued and recovered his claim, and the company carried the case—*Western Union Telegraph Company vs. Landis*—to the Supreme Court of Pennsylvania, where the judgment was affirmed. Judge Paxson, in the opinion, said: "1. That no payment was made for repeating the message is not important; had there been a demand and a refusal to pay, there would have been more force in the point; besides L. had a current account for messages with the company in which a charge for the repetition could have been made. 2. When a message is not delivered and suit is brought for damages, it may be shown that the telegram was not intelligible to the operator; but here there was a delivery, and besides it is evident that the alleged uncertain term was a quotation for sheep, many of which the operator took and sent daily. 3. L. is entitled to recover his actual loss in the transaction. He had to pay 'five seventy' instead of 'five six' for the sheep, or 54 cents more for each animal. That was his loss by reason of the negligence of the company. We have decided in another case that the difference between the cost to the sender of a telegram and the price the message gave is the proper measure of damages."

TELEGRAPH COMPANY—DELAY IN DELIVERING MESSAGE.

C. F. & W. cotton merchants, in North Carolina, had agreed to deliver 100 bales of cotton in December and 500 bales in the following February to certain persons in New York, and to provide for these deliveries, in November they telegraphed to T. & Co., their New York agents: "If market is firm and advancing, Narrator," and, after receiving a dispatch giving them the morning quotations in New York, they sent a second message containing simply the word "Narrator." This was one of the words in the code used by C. F. & W. and T. & Co. By reason of some delays in transmission, there being no direct line to New York, which required the use of "relay offices" and the messages reaching New York by different connections, though the second message was sent two hours and 30 minutes later, it reached T. & Co. three minutes earlier than the first message. There was nothing to indicate that the market would advance, and T. & Co. did not pay, as they thought the dispatch gave the indication,

there being nothing to indicate which message was first sent. It was shown that C. said to the operator when he delivered to him the first message, at 9.30 a. m., that he wished it to be sent at once, so that it would reach New York before the opening of the cotton market that day. Cotton rose soon after this, and C. F. & W. demanded that the company pay them, as their loss, the difference in the price at which they ordered the purchase of the 600 bales, and the subsequent market price, three days later, though they did not buy the cotton then, making a claim for money lost through a lost opportunity. They got a judgment, and the company carried the case—*Cannons vs. Western Union Telegraph Company*—to the Supreme Court of North Carolina, where the court decided in its favor. The chief justice, Smith, in the opinion, said: "1. The plaintiffs were negligent in sending the second message without any explanation as to the first sent, and their agents acted with indifference in not seeking further instructions about these inconsistent telegrams. But the message itself was not so written that its importance could be understood by the operator, and therefore nominal damages for the loss suffered from the delay in its transmission only can be recovered. 2. In this case, however, no damages can be recovered, because no actual loss has been suffered; the loss complained of was merely an opportunity to have made a bargain, which would have been profitable if the cotton had been sold at the advanced price three days later. Speculative losses cannot be recovered in this action."

Formation of Petroleum.—The theory is held by Professor Mendeleef, of Russia, that petroleum is produced by water, which penetrates the earth's crust and comes in contact with glowing carbides of metals, especially of iron. The water is decomposed into its constituent gases, the oxygen uniting with the iron, while the hydrogen takes up the carbon and ascends to a higher region, where part of it is condensed into mineral oil, and part remains as natural gas, to escape wherever and whenever it can find an outlet. If this assumption is correct, and a sufficient store of metallic carbides is contained in the earth's interior, petroleum may continue to be formed almost indefinitely, and yield a supply of fuel long after the coal has become exhausted. Professor Mendeleef supports his views by producing artificial petroleum in a manner similar to that by which he believes the natural product is made.

Capt. William R. Jones, general superintendent of the Edgar Thomson Steel Works, at Braddock, Pa., and the Homestead Steel Works, at Homestead, Pa., sailed for Europe on Saturday, the 11th inst. He expects to be gone three months, and will visit all the principal iron and steel works in England and on the Continent.

In July all previous records were again broken at the Sault Ste. Marie Canal. The number of vessels passing through the lock and the total tonnage were unprecedented, and the record for the season is far ahead of the same period last year, when the canal's business was away beyond anything previously known. It looks very much as if the "Soo" Canal, in seven months of 1888, would almost equal the tonnage record of the Suez Canal for the whole year. The growth of the commerce of Lake Superior is one of the wonders of this wonderful country. So says the *Cleveland Leader*. The Canadian government has asked for tenders for the construction of the Sault Ste. Marie Canal,

and for the enlargement of the St. Lawrence canals. The advertisement calls for the construction of a canal on the Canadian side of the river, through the Island of St. Mary. With the Canadian Sault Canal built, the St. Lawrence and Welland canals enlarged, and the use of the St. Clair flats guaranteed by treaty, Canadian vessels will have a right-of-way from Lake Superior to the ocean.

Coloring Porcelain.—In a paper on coloring porcelain in a high temperature furnace, Mr. H. Seger (*Chem. Zeit.*) states that the best porcelain hardly ever contains less than 0.5 per cent. of ferrous oxide, mostly 1.0 per cent. and more, and that the more highly colored Chinese and Japanese porcelains contain as much as 2.5 per cent. The yellow color of porcelain is due to the presence of this iron in the state of ferric oxide, the green color to its presence as ferrous oxide, the color actually produced depending on the nature of the burning. The gray color due to a mixture of the two oxides seldom occurs, and then only in fusible porcelains. The yellow coloration is far more intense than the green; the latter results when a reducing flame is employed, and porcelain colored pale green thereby becomes yellow by repeated heating in an oxidizing flame, the ferrous iron being converted into ferric. The green color of Indian and Chinese Celadon porcelain is due to its containing 1.5 to 2.0 per cent. of ferrous oxide. Normal white porcelain, when slowly cooled, assumes a yellow tinge, also due to oxidation, and for this reason it is customary to cool the mass rapidly. The author has never observed any yellow coloration produced by sulphates; in fact, sulphates only occur in very basic and not in the very acid silicates such as porcelain. Also the magnetic oxide of iron is reduced either to ferrous or ferric oxide in presence of silica, and in its absence the metal would result, so that the idea that the whole of the iron is converted, at the high temperature employed in the burning into Fe₂O₃, is out of the question. These remarks regarding the coloring of porcelain also hold good in the case of glass.

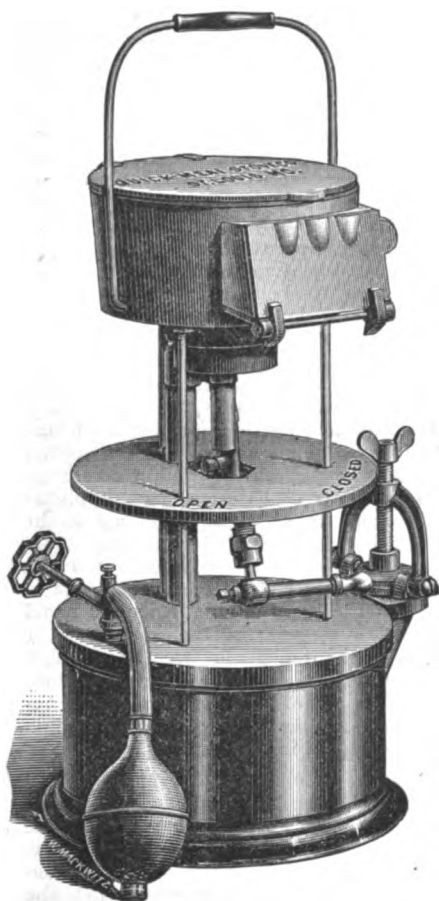
The following, from an unknown source, is worthy of consideration: "If the theory of the 'theoretical' man is true theory, and if the practice of the 'practical' man is correct practice, then the theory and the practice will fit each other line for line and dot for dot. The practical man becomes a theoretical man when he begins to give his reasons for doing as he does. If a man learns those laws of nature which relate to mechanics from books or lectures and then applies these laws to practice and makes no mistake in their application, he comes squarely face to face with the man who begins at the 'practical' end and works up till he learns the same laws. They start at opposite ends of the same path, but both get there all the same."

Pauper labor is crowding into the coke regions about Connellsville, in Pennsylvania, as well as into the anthracite coal country. The foreign labor importation among the coke ovens is mostly Hungarian, and nearly 10,000 of these people have been induced to go into Fayette and Westmoreland counties within the past few years, and the American laborers have been almost totally displaced. Most of these Hungarians who have taken possession of the coke regions originally came from Baltimore.

The American Sheet Iron Works, at Phillipsburg, N. J., after an idleness of several weeks, started up again on the 14th inst.

Combined Plumbers' and Tinnern's Furnace.

The Ringen Stove Company, of St. Louis, Mo., are offering the trade a very desirable heating furnace, adapted for plumbers' and tinnern's use, a perspective view of which is presented in the accompanying engraving. It is designed especially for out-of-door use, as the burner is fully protected from the wind. It has a capacity for heating two soldering-irons at a time, which are introduced through the side door shown in the upper part of the pot. The door, when open, forms a sort of shelf or rest for the support of the irons when being heated. In order to change the device into a plumber's furnace it is simply necessary to close the side door and



Quick Meal Plumbers' and Tinnern's Furnace.

open the lid. The pot containing the lead to be melted is placed directly over the flame, which spreads out and entirely covers the bottom of the vessel. The furnace is provided with a bail, which renders transportation a very easy and convenient matter, and it weighs complete only 12 pounds. After the tank has been filled air pressure is introduced by means of the rubber pump clearly shown in the engraving. The manufacturers state that it will burn for several hours without attention. It is sold under the name of Quick Meal.

Hull's Campaign Torch.

The rapid approach of the time when torchlight processions will be the fashion in every city, town and village in the country has turned the attention of certain manufacturers to the production of torches adapted to meet the requirements of the occasion. Among the more recent candidates for public favor may be mentioned the device being offered the trade by Mr. M. L. Hull, of Cleveland, Ohio, a view of which is presented in the accompanying engraving. The device consists of a

rod made in two sections, having at the upper end a gasoline burner, while just below the upper section of the rod is placed a tank for the fluid, having a capacity of about 3 quarts. Connected with the tank is a flexible handle, which may be employed as an air pump for forcing



Hull's Campaign Torch.

air into the tank. The light produced is claimed to be far superior to that of ordinary coal-oil torches, while all parts are made perfectly tight, so that no gasoline can escape. An occasional squeeze of the handle is said to be all that is necessary to keep up a bright light. The lower section of the rod is painted, which enables the torch to be set upright in the ground when not in use. The manufacturer states that these torches are light and durable, that they can safely be carried in any position or angle, and that they are specially designed for the use of clubs in the larger cities.

Smelters' Ladle.

A very convenient article for the use of plumbers, smelters, tinnerns and all who have occasion to melt lead, tin or zinc, is being offered the trade by S. A. Suydam, of No. 550 Hudson street, New York. It consists of a ladle made without seam or joint, stamped from sheet steel of No. 15 gauge. It measures 4½ inches in height, has a bottom diameter of 6¼ inches, a top



Smelters' Seamless Steel Ladle.

diameter of 8¼ inches, and a lip which projects 3¼ inches. It has a capacity for one gallon. In the engraving is shown a handle, 12 inches in length, designed for attachment to the side of the ladle and to facilitate turning out its contents. The bail is rigidly fastened by three rivets on

each side. The ladle is made of a single piece of metal and is stamped complete with the lips.

Kemper's Garden Sprinkler.

Messrs. Theodore Michel & Co., of No. 751 Wabash street, St. Paul, Minn., are offering the trade a form of potato-bug exterminator for which they make many strong claims. The reader may gather a very clear impression of the general arrangement of the device from an inspection of the cut presented herewith, which shows the sprinkler ready for use. The tank is made of galvanized iron, finely varnished and striped, giving it an ornamental appearance. Its capacity is about 2½ pails of water, with which is mixed the paris green or other poison. Within the tank is an arrangement for agitating the contents, said mechanism being connected with a lever, shown at 2 in the engraving. From the end of this lever depends a strap, by means of which the operator may keep the



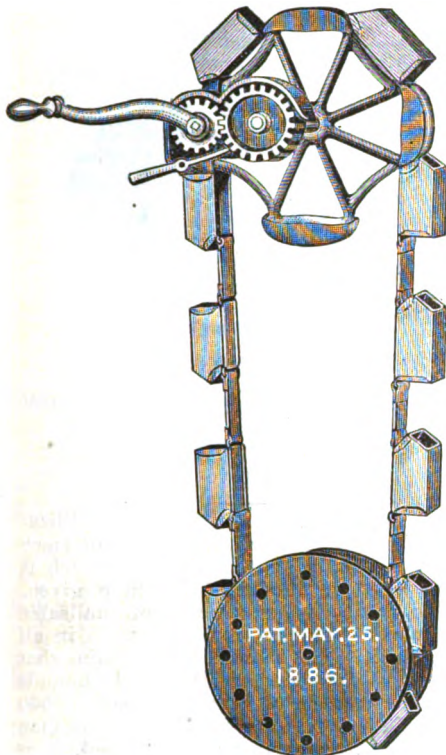
Kemper's Garden Sprinkler.

contents of the tank in a constant state of agitation. From the bottom of the tank is led a rubber hose, on the end of which is a fine sprinkler or nozzle for throwing the mixture contained in the tank upon the plants. Three sizes of nozzles accompany each sprinkler. In the nozzle, 3, is placed a valve which enables the operator to control the quantity of water issuing from it. The manufacturers state that vines may be very rapidly sprinkled by the use of this device, and that it requires less water and poison for a given number of feet than is necessary by the old method. The claim is also made that with small potatoes and a fine sprinkler the tank need be filled but twice for an acre, while once filling is sufficient for a row 1000 feet in length.

Within the past ten days nearly 100 vessels have been engaged, with a capacity of 600,000 barrels, to load petroleum for Europe, which does not look as though the tank steamers were absorbing the trade.

The Bucket Pump.

The rapidly growing belief on the part of the general public that all water intended to be used for domestic purposes should be more or less purified has turned the attention of manufacturers of pumping apparatus in this direction, and numerous devices are being brought out which are claimed to accomplish the objects sought. Among the concerns working in this direction may be mentioned the Water Elevator and Purifier Company



The Bucket Pump.—Fig. 1.—Complete Fixtures Ready for Placing in Position in the Well.

of 441 and 443 Plum street, Cincinnati, Ohio, who have placed upon the market a bucket pump and water purifier, several views of which are presented in the accompanying illustrations. This pump consists of an endless chain composed of buckets, made of a single piece of sheet iron, suspended in the curb by an iron top wheel, so constructed as to prevent any wear in the buckets and the bottom wheel. In Fig. 1 are shown the fixtures complete as they are ready to be dropped through the well curb into the cistern, the bottom wheel resting in the chain unfastened. The buckets are attached to steel-wire links by double flanges and connected together by flat annealed-steel links, one of which is shown in Fig. 2, all being thoroughly galvanized. The bot-

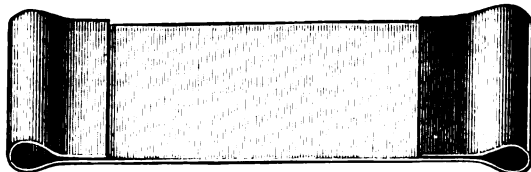


Fig. 2.—Flat Steel Link for Connecting the Buckets.

tom wheel is made of three pieces of fine quality sheet steel, put together without bolts, rivets or solder. The spout and receiver are made of the best galvanized cast iron, the principal features of which are covered by patents owned by the company. A double gearing, with shield, is provided to guard against injury from catching the fingers in the cog-wheels and is also a protection from ice in winter. The endless

chain, the manufacturers state, is sufficiently strong to sustain a weight equal to ten times the quantity of water raised. It is formed of alternate double-flanged, one-piece buckets and flat links made of the very best galvanized iron and is prac-

tically a solid chain. Fig. 3 of the illustrations shows one of these buckets as it is formed over the round steel link, while Fig. 4 represents a single-piece bucket as it appears before it is formed into the shape shown in Fig. 3. The pump has a capacity of 10 gallons of water per minute, and is so constructed that it can be easily operated, even when used in connection with deep wells. The manufacturers claim that it never freezes, having in the past successfully stood a test of 38° below zero. They also claim that in operation the water is purified by the cups or buckets carrying to the bottom of the well at each revolution of the chain as many gallons of air as there are gallons of water carried to the top, so

that whenever the chain is in motion a constant current of air is passing through the water.

The hardships resulting from an overstocked labor market were illustrated in the course of the examination in this city last week before the Congressional Com-

mittee. A young woman who had worked for six years in a shirt factory in New York testified that formerly the employees, mostly American girls, earned from \$7 to \$9 per week. Of late Russian and Polish immigrants have been introduced into the factories and wages have been forced down so that it required hard work to earn \$5 a week. These imported Russian and Polish workers, accustomed to low wages and a

wretched mode of living, are willing to work for \$4 a week. An English woman who came to this country six years ago said that at that time she could earn \$10 a week making cloaks and shirts, and now she was lucky if she got \$5, sometimes not

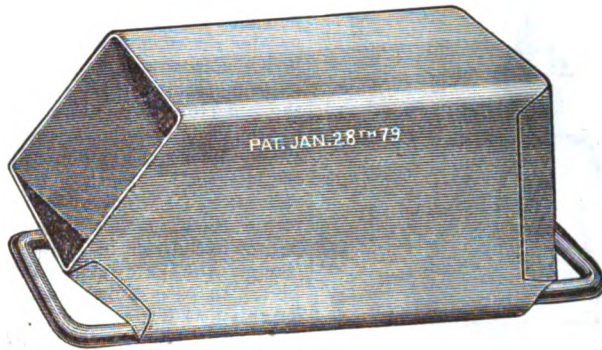


Fig. 3.—View of Single-Piece Flanged Bucket.

making more than \$2 or \$3. Mrs. Anker who has made a study of the condition of working women in this city, declared that women who ten years ago averaged \$10 or \$12 a week working upon white goods, could now hardly make \$5, and those who worked for contractors were forced to be satisfied with \$3. These are only illustrative cases.

The indications of natural gas at Chicago, which were so promising a few months since, had vanished completely, when new interest was aroused on the 8th inst. by a sudden flow from an artesian well which was being sunk at a malt house on Cedar street. The well was but 80 feet deep

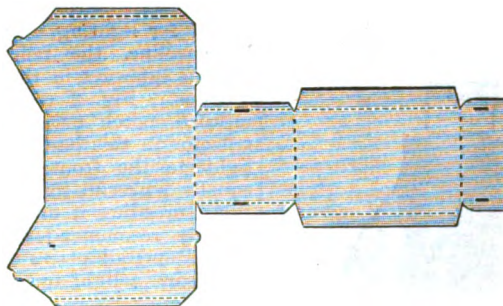


Fig. 4.—Single-Piece Bucket Before it is Formed into the Shape Shown in Fig. 3.

when the gas rushed out. It was ignited and the blaze shot up 8 feet at first, but on burning all night it gradually subsided until it was only 18 inches high, and appeared likely to continue to become more feeble.

The new Argentine Pacific from Buenos Ayres to the foot of the Andes has on it what is probably the longest tangent in the world. This is 340 km. (211 miles), without a curve. In this distance there is not a single bridge and no opening larger than an ordinary culvert, no cut greater than 1 m. in depth, and no hill of a height exceeding 1 m. There is almost an entire absence of wood on the plain across which the western end of the road is located. This has led to the extensive use of metallic ties, which will be employed on nearly the entire road.

A novel electric railway is undergoing construction in a suburb of St. Paul, Minn. The railroad is an elevated structure, and the cars are hung below it close to the street level. They hang from sets of wheels taking their power from the tracks, which are charged with electricity.

The Wheeler System of Reflectors.

The Wheeler Reflector Company, 24 Washington street, Boston, Mass., as proprietors of the Wheeler System of Reflectors, manufacture a great variety of

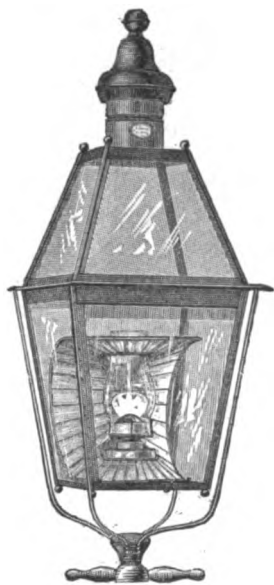


Fig. 1.—Street Light.

lamps and lanterns of all kinds fitted with the Wheeler reflectors. These reflectors are adapted to general use, utilizing, it is claimed, all the light possible and distributing it where it is needed. They are adapted, furthermore, to all methods of lighting, and can be applied with little, if any, change to the present fixtures. Their shapes and forms vary according to circumstances, special reflectors being made for almost every conceivable place. The increased efficiency of a light with these reflectors claimed by the manu-

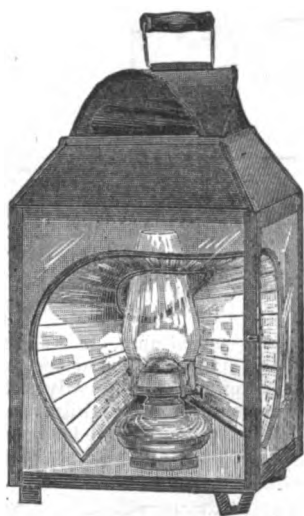


Fig. 2.—Stable Lantern.

facturers is over 300 per cent., due to utilizing the light which is ordinarily dispersed where not wanted. It is pointed out that under this system the number of burners may be greatly reduced, while at the same time there will be an increase of light. The system consists of forms made up by combinations of surfaces generated by the revolution of one or more of the "conic sections" about one or more axes of revolution. The surfaces are so arranged about the light as to give a uniform intensity of light over the area and also to intercept the rays which usually go upward and are lost. The reflectors, which are usually made of heavy tin, japanned or plain, as desired, are described as being very strong and rigid and yet of a neat and graceful appearance. They are

usually lined with imported crystal glass, which is backed with pure metallic silver, well protected by a coating, rendering it impervious to moisture, gases and other injurious influences. The glass is cut into small facets to fit various forms of shells, the result being, it is said, that a pleasing light is produced which is neither glaring nor blinding. Where greater ornamentation is desired, polished brass, nickel or copper shells are substituted for tin. It is pointed out that the reflectors, being made of a number of pieces of glass, are not easily destroyed by a single blow, and the manufacturers particularly call attention to the fact that the merit of their system is due to the forms used, rather than to any superior excellence of materials employed, though they are claimed to be of the best. In case of breakage facets will be supplied at 5 cents apiece, and can easily be put in place. To illustrate the sys-



Fig. 3.—Wall Bracket Lamp.

tem of reflectors we present herewith a few of the different kinds in use. Fig. 1 shows the reflector as applied to street lights, for lighting up and down a street by gasoline, the reflected light being thrown sideways in the two opposite directions. Fig. 2 represents a form of railroad, porch or stable lantern. The reflector in this lantern throws a straight light to the front, besides throwing an equally powerful light diagonally at each side, spreading it uniformly. This is especially recommended for lawns, yards, stables and all places where it is desired to throw a light uniformly over consid-

light longitudinally in two opposite directions. It is adapted to any kind of electric light, with either single or double carbons and with globes of 12-inch diameter or less. In addition to the lamps which we have illustrated and mentioned the

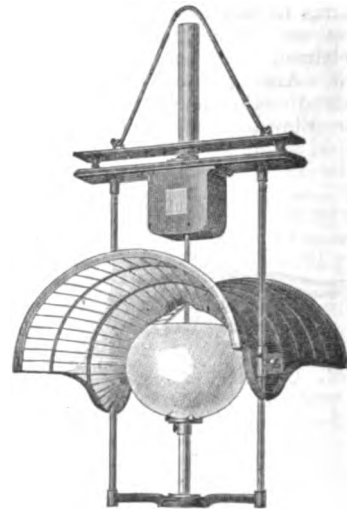
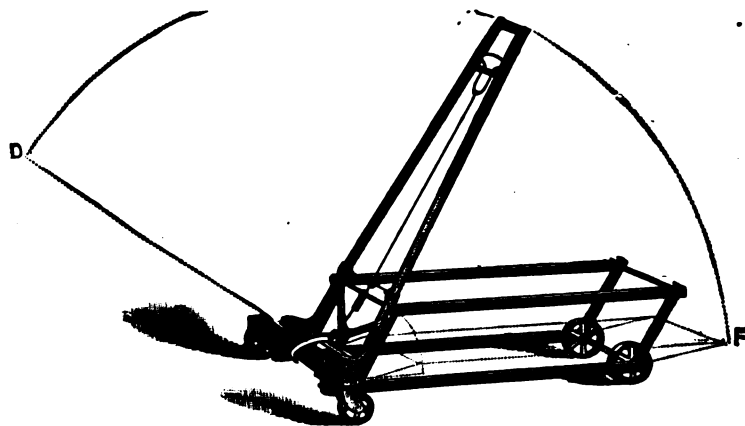


Fig. 4.—Electric Arc Light.

Wheeler Reflector Company make a great number of others.

A New Stove Truck.

The H. & D. Truck Company, of Elizabethtown, Pa., have just brought out a new stove-truck, a general view of which is presented in the engraving here given. The device is constructed of malleable iron and steel, and is very durable in all its parts. The manufacturers claim that it is easily operated, weighs only 40 pounds and is capable of carrying a load of 500 pounds. It is so constructed that one man can use it, and it may be turned, it is claimed, in its own length. A very good idea of its method of operation may be gained from the following directions read in connection with the engraving herewith presented: Throw forward the handle, which, in the normal position of the truck, is at F to D. Bear lightly upon it and, with the first two fingers, catch the wire loop shown between the handles. Draw this forward and release the hook from the front cross-bar. Elevate the handle



A New Stove Truck.

erable space. In Fig. 8 a wall-bracket lamp, which is made in several sizes and styles, is illustrated, the shape of this reflector closely resembling the one used in the lantern just described, and serves the same purpose of diffusing the light equally throughout a room. The illustration, Fig. 4, shows one style of electric-light reflectors. This overhead reflector is especially adapted for use in streets, mills, railway stations, or any place where it is desired to distribute the

above the upright pins in front of the cross-bar and give the wire a sudden strong pull, which allows the frame to drop down flat. Run the bench under the stove to be moved, elevate the handles until they engage with lips on the lower part of the front bracket, bear down until the hook catches the front bar, and the load is ready for removal to its destination. In order to unload proceed as described, taking care, however, to keep hold of the handle until the stove is at rest.

CURRENT HARDWARE PRICES.

AUGUST 15, 1888.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers' name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers at the figures named.

Ammunition.

Caps, Percussion, 1000—	
Black & Goldmark's	
F. L. Waterproof, 1-10's	50¢
B. B. Trimmed Edge, 1-10's	55¢
B. B. Ground Edge, Central Fire, 1-10's	70¢
Double Waterproof, 1-10's	74¢
Masket Waterproof, 1-10's	50¢
G. D.	55¢
A. B.	50¢
Jackson Metallic Cartridge Co.	
F. C. Trimmed	50¢
F. L. Ground	55¢
Con. Fire Group	70¢
Double Water proof	74¢
Double Water proof in 1-10's	74¢
B. B. Genuine Imported	45¢
May's E. B.	54¢
May's L. Waterproof, Central Fire	71¢

Cartridges—

Rim Fire Cartridges	dis 50¢5&2 1/2
Rim Fire Military	dis 50¢5&2 1/2
Central Fire Pistol and Rifle	dis 50¢5&2 1/2
Central Fire, Military & Sporting	dis 50¢5&2 1/2
Blank Cartridge, except 22 and 32 cal. an additional 10% over above discounts.	
Blank Cartridges, 22 cal.	\$1.75, dis 1/2
Blank Cartridges, 32 cal.	\$3.50, dis 1/2
Primed Shells and Bullets	dis 1/25&2 1/2
B. B. Caps, Round Ball	\$1.75, dis 1/2
B. B. Caps, Conical Ball, Swaged	\$2.00, dis 1/2

Primers—

Sheridan Primers all sizes, and B. L. Caps (for Sturtevant Shells)	\$1.00, dis 1/2
All other Primers, all sizes	\$1.20, dis 1/2

Shells—

First quality, 4, 8, 10 and 12 gauge, dis 25¢10&2 1/2	
First quality 7, 14, 16 and 20 gauge (\$10 list)	dis 30¢10&2 1/2
Club, Rival and 10 gauge, \$0 list	dis 38¢
Climax Brands, 12 gauge, \$8 list	dis 41¢
Club, Rival and Climax Brands, 14, 16 and 20 gauge	dis 30¢10&2 1/2
Reibold's Combination Shot Shells	dis 15¢2 1/2
Brass Shot Shells, 1st quality	dis 60¢2 1/2
Brass Shot Shells, Club, Rival and Climax	dis 65¢2 1/2

Shells Loaded—

List No. 19, 1887	dis 20 & 10 %
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Wads—

G. M. C. & W. R. A.—B. E., 11 up	\$2.00
G. M. C. & W. R. A.—B. E., 9&10	2.80
G. M. C. & W. R. A.—B. E., 7&8	3.00
G. M. C. & W. R. A.—B. E., 11 up	3.10
G. M. C. & W. R. A.—P. E., 9&10	4.00
G. M. C. & W. R. A.—P. E., 7&8	4.90
May's B. E., 11 up	\$1.75
May's B. E., 11 & 20	\$2.80

Anvils—

Single Anvil	\$ 104, dis 30 & 30¢5 & 2 1/2
Peter Wright's	94¢
Armstrong's Mouse Hole	84¢
Armstrong's Mouse Hole, Extra	11¢
Whitman's	94¢
J. & R. Carr, Patent Solid	11¢
Steel Pipe and Drills	
Miller's Falls Co.	\$18.00, dis 30
Cheney Anvil and Vice	dis 30
Allen Combined Anvil and Vice	dis 40&10
Moore & Barnes Mfg. Co.	dis 33¢4 & 2 1/2

Augers and Bits.

Douglas Mfg. Co.	
New Haven Copper Co.	
Wm. A. Ives & Co.	dis 70 %
Lumphyville Mfg. Co.	
French, Swift & Co. (P. H. Beecher)	
Cook's, Douglas Mfg. Co.	dis 55 %
Cook's, New Haven Copper Co.	dis 50&10&50&10&2 1/2
Ives Circular Lip	dis 60 %
Patent Solid Head	dis 30 %
C. E. Jennings & Co., No. 10, extension up	dis 40 %
C. E. Jennings & Co., No. 30	dis 40 %
C. E. Jennings & Co., Auger Bits, in paper boxes	dis 30 %
Set 33¢, quarters, No. 5, 6, 8, No. 30, 32	dis 30 %
Low's Patent Single Twist	dis 45 %
Small Jennings' Augers and Bits	dis 25 %
Imitation Jennings' Bits (new list)	dis 60&60&2 1/2
Pugh's Black	dis 20 %
Car Bits	dis 15&10&40
L'Hommedieu Car Bits	dis 15&10
Forstner Pat. Auger Bits	dis 10 %
Yellow Augers—	
Ives	dis 25&10
French, Swift & Co.	dis 25&10&2 1/2
Douglas	
Bonner's Adjustable 7 dos. 545	dis 40&10
Stearns	dis 20&10
Ives Expansive, each \$4.50	dis 50&10
Universal Expansive, each \$4.50	dis 30 %
Wood's	dis 25 & 25&10

Expansive Bits—

Chart's small, 118; large, 280	dis 25 & 55&2 1/2
Ives No. 4, per dos., 280	dis 25 & 40 %
Swan's	dis 40 %
Stearns, No. 1, 188; No. 2, 283	dis 25 %
Stearns, No. 2, 248	dis 20 %

Small Bits—

Common	gross \$2.75 @ 32.25
Diamond	gross \$1.10, dis 25&10 %
"Dee"	dis 25 & 25&2 1/2
Double Cut, Shepardson's	dis 45 & 45&2 1/2
Double Cut, Ct. Valley Mfg. Co.	dis 30&10
Double Cut, Hartwell's, 7 gro.	dis 25
Double Cut, Douglas	dis 40&10
Double Cut, Ives	dis 60 & 60&2 1/2

Set Stock Drills—

Horse Twist Drills	dis 50&10&2 1/2
Standard	dis 50&10&2 1/2
Cleveland	dis 50&10&2 1/2
Syracuse, for metal	dis 50&10&2 1/2
Syracuse, for wood (wood list)	dis 80 & 30&2 1/2
Williams' or Holt's, for metal	dis 50&10&2 1/2
Williams' or Holt's, for wood	dis 40&10

Augers and Bits—

L'Hommedieu's	dis 15&10 %
Watrous's	dis 15&10 %
Small's	dis 15&10 %
Small's Ship Auger Pat'n Car Bits	dis 15&10 %

Awl Blades.

Sewing, Brass Ferrule	\$3.50 gross—dis 45&10 %
Patent Sewing, Short	\$1.00 gross—dis 40&10 %
Patent Sewing, Long	\$1.20 gross—dis 40&10 %
Patent Peg, Plain Top	\$10.00 gross—dis 45&10 %
Patent Peg, Leather Top	\$12.00 gross—dis 45&10 %

Awls, Brad Sets, &c.

Wls, Sewing, Common	gross \$1.70—dis 35 %
Wls, Shouldered Peg	gross \$2.45—dis 40&40&10 %
Wls, Patent Peg	gross \$3.45—dis 40&40&10 %
Wls, Shouldered Brad	\$2.70 gross—dis 35 %
Wls, Handled Brad	\$7.50 gross—dis 45 %
Wls, Handled Scratch	\$7.50 gross—dis 45&10 %
Wls, Socket Scratch	\$1.50 gross—dis 25 & 30 %

Awls and Tool Sets.

Ives's Set, A. Wls & Tools, No. 20, 7 dos. \$10—dis 50&10 %	
Ray's Ad. Tool Hds., Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	
Miller's Falls Ad. Tool Hds., Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	
Henry's Combination Haft	7 dos. \$0
Brad Sets, No. 42, \$10.50, No. 43, \$12.50	dis 70&10&2 1/2
Brad Set, Stanley's Excelsior, No. 1, \$7.50	dis 30&10 %
Brad Set, Stanley's Excelsior, No. 2, \$4.00	dis 30&10 %
Brad Set, Stanley's Excelsior, No. 3, \$5.50	dis 30&10 %

Axes.

Maher's and Special Brands—	
First quality	gross \$5.00 @ \$5.50
Others	gross \$5.00 @ \$5.75

Axle Grease.

Fraser's, in bulk	Keg 7 1/2, 40; Pail 7 1/2, 50 net
Fraser's, in boxes	gross \$9.50
Dixon's Everlasting, in boxes	gross \$12.50
Dixon's Everlasting, 10-lb pails, each 50¢	
Lower grades, special brands	gross \$5.50 @ \$7

Axles.

No. 1, 4¢ @ 4 1/2¢ No. 2, 5 1/4¢ @ 5 1/2¢	
No. 7 to 18	dis 50¢55 %
No. 19 to 25	dis 60&10&10&70 %
National Wrought Steel Tubular Self-Oiling	
Standard Farm (1 to 5) and Special Farm (A1 to A5)	
Less than 10 sets	dis 33¢4 %
Over 10 sets	dis 33¢4&2 1/2 %
Strong Exp. (6 to 9), & XX Strong Truck (10 to 16)	
Less than 10 sets	dis 10 %
Over 10 sets	dis 10&2 1/2 %

Spring Holders.

Sorensen's Pat., 7 dos \$18	dis 60 %
Ballances—Spring Balances	dis 50 %
Common 24	gross \$1.50—dis 50 %
Charlton's Spring Balances	dis 50 %
Charlton's Circular Spring Balances	dis 60 %

Belts.

Light Brass	dis 70&10 %
Extra Heavy	dis 60&10 %
White Metal	dis 60&10&10 %
Silver Chime	dis 25&10&2 1/2 %
Globe (Cone's Patent)	dis 25&10 & 35 %

Doors.

Gong, Abbe's	dis 25&10 & 35 %
Gong, Yankee	dis 40&10 %
Gong, Barton's	dis 40&10 & 50 %
Orank, Taylor's	dis 25&10 %
Orank, Brooks	dis 50&10&2 1/2 %
Orank, Cone's	dis 10 %
Orank, Connolly	dis 20&10 %
Lever, Sargent's	dis 60&10 %
Lever, Taylor's Bronzed or Plated	dis 60&10 %
Lever, Taylor's Japanned	dis 25&10 %
Lever, R. E. & Co.'s	dis 50&10&2 1/2 %
Pull, Brook's	dis 50&10&2 1/2 %
Pull, Western	dis 25&10 %

Common Wrought.

Western, Sargent's list	dis 20&10 %
Western, Sargent's list	dis 70&10 %
Kentucky "Star"	dis 20&10 %
Kentucky, Sargent's list	dis 70&10 %
Dodge, Genuine Kentucky, new list	dis 70&10&10 %
Texas Star	dis 60&10 & 40&10&2 1/2 %
Farm Belts	dis 25 & 30 & 35¢
Steel Alloy Church and School Belts	dis 40 %
Belts—Blacksmiths	dis 40&10&2 1/2 & 60 %
Molders	dis 40 & 40&10 %
Hand "Hollow"	dis 40&10 & 10 %

Belting, Rubber.

Common Standard	dis 70&10 %
Standard	dis 70&10&2 1/2 %
Extra	dis 60&10 %
N. Y. & P. Co., Standard	dis 60&2 1/2 %
N. Y. & P. Co., Extra Standard	dis 50&10 %
Beach Steps	
Vorrell's	gross \$2—dis 60 %
Hutchins's	gross \$5.00—dis 10 & 10&10 %
Weston's, per dos No. 1, \$10; No. 2, \$9	dis 25&10&2 1/2 %
McGill's	dis 25—dis 10 %

Bits—Auger, Gimlet Bit Stock, Drills, &c., see Augers and Bits.

Bit Holders.

Extension, Barber's	gross \$15.00—dis 40 & 40&10 %
Extension, Ives	gross \$20.00—dis 60&2 1/2 & 60&10 %
Diagonal	gross \$24.00—dis 40 %
Angular	gross \$24.00—dis 40&2 1/2 %

Blind Adjusters.

Domestic	per dos \$3.00—dis 33¢4 %
Excelsior	per dos \$10.00—dis 50&10&2 1/2 %
Washburn's Self-Locking	dis 20 & 20&10 %

Blind Fasteners.

Macrell's	gross \$2 pairs, \$1.00—dis 20&20&10 %
Van Sand's Screw Pattern	\$15 gross—dis 60&10 %
Van Sand's Old Pattern	\$15 gross—dis 55&10 %
Washburn's Old Pattern	\$20 gross—dis 60&10 %
Merriman's	new list, net
Austin & Kddy No. 3008	\$20 gross—dis 60&10 %
Security Gravity	\$20 gross—dis 60&10 %

Blind Staples.

Barbed, 1/4 in. and larger	gross \$8 & 8 1/2¢ net
Barbed, 3/4 in.	gross \$9 & 9 1/2¢ net

Blocks.

Ordinary Tackle, list April 17, '85	dis 40 %
Cleveland Block Co., Mal. Iron	dis 60 %
Novelty Tackle Blocks, Mal. Iron	dis 60 %

Belts.

Door and Shutter—	
Cast Iron Barrel, Square, &c.	dis 70 & 70&10 %
Cast Iron Shutter Bolts	dis 70 & 70&10 %
Cast Iron Chain (Sargent's list)	dis 60&10 %
Ives' Patent Door Bolts	dis 80 %
Wrought Barrel	dis 70 & 70&10 %
Wrought Square	dis 70 & 70&10 %
Wrt Shutter, all Iron, Stanley's list	dis 60&10 %
Wrt Shutter, Brass Knob, Stanley's list	dis 40&10 %
Wrought Shutter, Sargent's list	dis 60&10 %
Wrought Sunk Flush, Sargent's list	dis 55&10 %
Wrought Sunk Flush, Stanley's list	dis 50&10 %
Wrought R. K. Flush, Com'n Stanley's list	dis 5&10 %

Carriage—

Com. list June 10, '84	dis 75&5&2 1/2 %
Genuine Eagle, list Oct. '84	dis 75&10 %
Phila. pattern, list Oct. 7, '84	dis 75&10&75&10&2 1/2 %
R. & W. old list	dis 70 %

Trav.

Common, list Feb. 23, 1883	dis 70 %
P. C. B. & N. Co., Empire, list Feb. 23, 1883	dis 70 %
P. C. B. & N. Co., Philadel., list Oct. '84	dis 82¢4 %
P. C. B. & N. Co., Keystone, Phil. list Oct. '84	dis 80 %
P. C. B. & N. Co., Norway, Phil. list Oct. '84	dis 75&10 %
Am. S. Co., Norway, Phil. list Oct. '84	dis 75&10 %
Am. S. Co., East's, Phil. list Oct. '84	dis 80 %
Am. S. Co., Philadel., list Oct. 16, '84	dis 87¢4 %
Am. S. Co., Bay State, list Feb. 23, '88	dis 70 %
R. & W., Philadel., list Oct. 16, 1884	dis 82 %
R. & E. Mfg. Co.	dis 70 %

Stoves and Pumps—

Stove	dis 62¢4 %
Flow	dis 60&2 1/2 %
Am. S. Co. Stove, Annealed	dis 62¢4 %
R. B. & W. Flow	dis 55 %
R. B. & W. Stove	dis 62¢4 %
R. & E. Mfg. Co., Stove	dis 62¢4 %
Machine	dis 75&10 & 75&10&2 1/2 %
Bolt Ends	dis 75&10 & 75&10&2 1/2 %
Borax	gross \$9¢10&4 %

Boring Machines.

Without Augers.	Upright.	Angular.
Douglas.....	\$5.50	\$9.75.....dis 60 %
Snell's, Rice's Patent	5.50	6.75,dis 40&10&10 %
Jennings.....	5.50	6.75,dis 48&45&10 %
Other Machines.....	3.85	2.75.....net
Phillips' Pat., with Augers	7.00	7.50.....net

Press Machines.
Knox, 4½-inch Rolls..... \$1.25 each..... dls 25 ¢
Knox, 6-inch Rolls..... \$2.50 each..... dls 50 ¢
Knox, 8-inch Rolls..... \$4.00 each..... dls 80 ¢
Eagle, 5½-inch Roll..... 2.25..... dls 45 ¢
Crown, 4½-in. \$2.50; 6-in. \$4.00; 8-in. \$5.50 each..... dls 50 ¢
Crown Jewel..... 6-in. \$2.50 each..... dls 50 ¢
America, 5-in., \$3; 6-in., \$2.40; 7-in. \$4.50 each..... dls 50 ¢
Domestic Fluter..... \$1.50 each..... dls 30 ¢
Geneva Hand Fluter, White Metal..... ¢ dos 12, dls 25 ¢
Geneva Hand Fluter, No. 1 \$15; 2, \$12.50; 3, \$10.50..... ¢ dos 12, dls 25 ¢
Shepard Hand Fluter, No. 55..... ¢ dos 11.50, dls 40 ¢
Shepard Hand Fluter, No. 110..... ¢ dos 11.50, dls 40 ¢
Shepard Hand Fluter, No. 66..... ¢ dos 95, dls 40 ¢
Clara's Hand Fluter..... ¢ dos 11A.00, dls 35 ¢
Combined Fluter and Snd Iron..... ¢ dos 11A.00, dls 30 ¢
Buffalo..... ¢ dos 11.00, dls 30 ¢
Fluting Scissors..... ¢ dos 11.00, dls 45 ¢
Fly Traps...... ¢ dos \$1.50 ¢ 1.75
Paragon..... ¢ dos 11.00 ¢ 1.25
Wedge Squeezers...... ¢ dos 12.00
Blair's..... ¢ dos 12.00
Blair's, "Climax"..... ¢ dos 11.25
Forks.—Hay, Manure, &c. Ass. Mts..... ¢ dos 65 ¢
Hay, Manure, &c. Phila. list..... ¢ dos 60 ¢ 60 ¢
Plated, see Spoons.
Freezers, Ice Cream.
Buffalo Champion..... ¢ dos 60A10A5 ¢
Shepard's Lightning..... ¢ dos 60 ¢
White Mountain..... ¢ dos 60 ¢
Fruit and Jelly Presses.
Enterprise Mfg. Co..... ¢ dos 10A10 ¢ 30 ¢
Henis..... ¢ dos 14.50 ¢ 15.00
P. D. & Co..... ¢ dos 14.00 ¢ 15.00
Shepard's Queen City..... ¢ dos 40 ¢
Fry Pans...... ¢ dos 75A25 ¢ 75A10A5 ¢
High List.
No..... 0 1 2 3 4 5 6 7 8
¢ dos..... \$3.75 4.70 5.50 6.56 6.55 7.50 8.75 10.00 11.25
Low List..... ¢ dos 70A10 ¢
No..... 0 1 2 3 4 5 6 7 8
¢ dos..... \$3.00 3.75 4.25 4.75 5.26 6.00 7.00 8.00 9.00
Fuse...... ¢ 1000 lb
Common Hemp Fuse, for dry ground..... ¢ dos 2.25
Cotton Rope Fuse, for dry ground..... ¢ dos 2.25
Single Taped Fuse, for wet ground..... ¢ dos 4.75
Double Taped Fuse, for very wet ground..... ¢ dos 6.00
Triple Taped Fuse, for very wet ground..... ¢ dos 7.25
Small Gutta Percha Fuse, for water..... ¢ dos 12.50
Large Gutta Percha Fuse, for water..... ¢ dos 12.00
Gauges.
Marking Mortise, &c..... ¢ dos 60A125 ¢
Wire, low list..... ¢ dos 10 ¢
Wire, Wheeler, Madden & Co..... ¢ dos 60 ¢ 60 ¢
Wire, Monahan & Co..... ¢ dos 10 ¢ 30 ¢
Wire, Brown & Sharpe's..... ¢ dos 10 ¢ 30 ¢
Gimlets.—Nail and Spike..... ¢ dos 50A10A25 ¢
"Eureka" Gimlets..... ¢ dos 40 ¢
"Diamond" Gimlets..... ¢ gross \$5.00
Double Cut, Shepardson's..... ¢ dos 45 ¢ 45 ¢
Double Cut, Ives'..... ¢ dos 45 ¢ 45 ¢
Double Cut, Douglass'..... ¢ dos 40 ¢ 40 ¢
"Be"..... ¢ gross 112, ¢ dos 25 ¢ 25 ¢
Glue.—Le Page's Liquid..... ¢ dos 25 ¢ 25 ¢
Upton's Liquid..... ¢ dos 25 ¢
W. N. Le Page's Improved Liquid Glue..... ¢ dos 25 ¢ 25 ¢
Glue Pots.
Tinned and Enamelled..... ¢ dos 40A25 ¢ 40A10 ¢
Family, Howe's "Eureka"..... ¢ dos 40 ¢
Family, Howe's "C" "Handy"..... ¢ dos 40 ¢
Grindstones.
Small, at factory..... ¢ ton \$7.50 ¢ 9.0
Grindstone Fixtures..... ¢ dos 70A10 ¢
Sargent's Patent..... ¢ dos 30A10 ¢
Reading Hardware Co..... ¢ dos 30A10 ¢
Hack Saws.—See Saw.
Halsters.—Cover's, Rope, ¼-in. Jute...... ¢ dos 60A25 ¢
Cover's, Rope, ¼-in. Hemp..... ¢ dos 40A25 ¢
Cover's Adj. Rope Halsters..... ¢ dos 40A25 ¢
Cover's Hemp Horse and Cattle Tie..... ¢ dos 60A10A25 ¢
Cover's Jute Horse and Cattle Tie..... ¢ dos 60A10A25 ¢
Hammers.
Handled Hammer.
Maydole's..... List Dec. 1, 1895, ¢ dos 25 ¢ 25A10 ¢
Buffalo Hammer Co..... List Jan. 1, 1896, ¢ dos 25 ¢ 25A10 ¢
C. Hammond & Son..... List Jan. 1, 1896, ¢ dos 25 ¢ 25A10 ¢
Humason & Beckley..... List Jan. 1, 1896, ¢ dos 25 ¢ 25A10 ¢
Atha Tool Co..... List Jan. 1, 1896, ¢ dos 25 ¢ 25A10 ¢
Fayette R. Plumb..... ¢ dos 25 ¢ 25A10 ¢
Vernon..... ¢ dos 25 ¢ 25A10 ¢
Metric Hand Tool, Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410

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Underhill Edge Tool Co.....	dis 55
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Meriden Britannia Co.....	dis 55
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A. C.....	dis 55
C. B. K.....	dis 55
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Corbin's Daisy, Hist February 15, 1836..... dis 60
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Burgin's New and Improved Adjustable Sash Lar-abes, Hist Jan. 5, 1847..... dis 25455
Hugulin's New Sash Locks, Hist Jan. 5, '87, dis 25455
Stoddard "Practical"..... dis 105
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Lieschke's Nos. 100 & 110 * gro. \$3.; 105, \$10., dis 204105
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Champion Safety, List March 1, 1838..... dis 65455

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Miles' "Challenge"..... # dos. \$20., dis 604-60455
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Enterprise Mfg. Co..... dis 20410 @ 305
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Saw Frames.
White Vermont..... # gro \$20 @ \$10
Red, Polished, and Varnished..... # dos \$1.50, dis 25

Saw Sets.
Stillman's Genuine..... # dos \$5.00 and \$7.75, dis 40455
Stillman's Imita..... # dos \$5.25 dis 404105
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Morrell's No. 1, \$15.00; Nos. 3 & 4, \$21.... dis 40410-604
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Crossett Crittenden..... per dos \$7.50
Crossett Keller, No. 1, \$15.00; No. 2, \$24.00, dis 334-33455

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Atkins Perfection..... \$15.00; Excelsior \$6.00 # dos

Scenes.
Hatch Counter, No. 171, good quality..... # dos \$21
Hatch Tea, No. 181..... # dos \$7.75 @ \$7.00
Union Platform Plain..... \$2.30 @ 2.20
Union Platform Striped..... \$2.30 @ 2.20
Chaillon's Operators Trip Scales..... dis 505
Gurekko's Favorite..... dis 25
Chaillon's Favorite..... dis 40
Family Turnball..... dis 304-304105

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Box, 2 Handle..... # dos \$6.00, dis 105
Defiance Box and Ship..... dis 304210
Foot..... dis 50410455
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Perforated Window and Door Frame..... dis 334-210
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Flat Head Bronze	dis 85
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Bench, Wood, Beech	dis 22.25
Bench, Wood, Hickory	dis 20.10
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Lat, Blunt Point	dis 75
Coach and Lag, Ulnies Point	dis 75
Bed	dis 25 & 10 @ 25 & 10.85
Hand Rail, Humason, Beckley & Co's	dis 70 & 10.75
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Jack Screws, Millers Falls List	dis 50 @ 50.85
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Barnard's List Trimmers	dis 20.85
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Seymour's, Lamp Dec. 1881	dis 60 & 10 @ 60 & 10.85
Heinrich's, List Dec. 1881	dis 60 & 10 @ 60 & 10.85
Heinrich's Tailor's Shears	dis 33.4
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Second quality C. S. Trimmers	dis 80 & 10 @ 80 & 10.10
Acme Cast Shear	dis 10 & 10
Diamond Cast Shear	dis 10 & 10
Clipper	dis 10 & 10
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Howe Bros. & Hulbert, Solid Forged Steel	dis 40
Cleveland Machine Co., Solid Steel Forged	dis 70
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Cass Shear Co., Nickled, same list	dis 60
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Moore's Anti-Friction	dis 60 & 10
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Sargent's list	dis 60 & 10
Reading list	dis 60 & 10.85
Ship Tools	
L. & J. W. & Co.	dis 20.85
Albertson Mfg. Co.	dis 25
Shoes, Horse, Mule, &c.	
Burden's, Perkins, Phoenix, at factory	\$4.00
Shoe—Add \$1 per keg above prices.	
On, wrought	
1000 lb lots	\$ 96
500 lb lots	\$ 106
Shot—Eastern prices, 2¢ off, cash, 5 days.	
Drop, 1/2 bag, 25 lb	\$1.25
Drop, 1/2 bag, 5 lb	\$1.30
Suck and Chilled, 1/2 bag, 25 lb	\$1.50
Suck and Chilled, 1/2 bag, 5 lb	\$1.55
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North—Jobbers frequently give 5 @ 7 1/2 extra on above.	
Granth's Black Iron	dis 50 & 10
Granth's C. S.	dis 60 @ 60 & 10
Granth's Solid Cast Iron	dis 20
Old Colony's Sanford Fork & Tool Co.	dis 20
St. Louis Shovel Co.	dis 20 @ 20.75
Hussey, Shins & Co.	dis 15 @ 25
Hubbard & Co.	dis 20 @ 20.75
Lehigh Mfg. Co.	dis 50 & 10
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Bowland's Black Iron	dis 60 & 10
Bowland's Steel	dis 60 & 10 @ 60 & 10
Shovels and Tongs	
Iron Head	dis 60 & 10 @ 60 & 10.85
Brass Head	dis 60 & 10 @ 60 & 10.10
Skeins, Thimble	dis 75 & 10 @ 75 & 10
Western list	dis 75 & 10 @ 75 & 10
Columbus Wire, Steel, list Nov. 1, 1887	dis 50 & 10
Coldbrook's Iron Co.	dis 50 & 10
Utica P. S. T. Skeins	dis 60
Utica Turned and Fitted	dis 35
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Buffalo Metallic, S. S. & Co., new list	dis 50 & 25 @ 50
Barier Flour Sifters	\$ 20.00
Smith's Adjustable Sifters	\$ 20.25
Smith's Adjustable Mill Strainer	\$ 20.00
Smith's Adjustable F. & C. Strainer	\$ 17.75
Shoes, Wrought	
Mesh 18, Nested, 70 lb	\$ 1.00
Mesh 20, Nested, 70 lb	\$ 1.00
Mesh 24, Nested, 70 lb	\$ 1.00
Shoes—School, by case	dis 50 & 10
Snaps, Harness, &c.	
Anchor (L. & S. Mfg Co.)	dis 65
Pitch's, Bristol	dis 50 & 10
Hotchkiss	dis 10
Andrews	dis 50
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Covert, New Patent	dis 60 & 10.85
Covert New R. E.	dis 60 & 10
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Covert's Adjustable, list Jan. 1, 1886	dis 25 & 10
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Bailey's (Stanley R. & L. Co.)	dis 40 & 10
Stearns	dis 30 & 10 @ 30
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Bonney's	\$ 10.00, dis 50
Stearns	dis 20 & 10
Ives	No. 1, \$15.00; No. 2, \$12.00; dis 55 & 10
Douglas	\$ 20.00, dis 20
Shoes and Forks	
Besting Central Stamping Co's list	dis 70 & 10 @ 70
Solid Cable and Tea, Central Stamping Company's	dis 70 & 10 @ 70
Buffalo, L. & C. Co.	dis 35 & 10 @ 35
Wool-Plated 4 mos. or 5 cash 31 days.	
Meriden Brg. Co., Rogers	dis 50
C. Rogers & Co.	dis 50
Rogers & Bro.	dis 50
Reed & Barton	dis 50
Wm. Rogers Mfg. Co.	dis 50 & 10 @ 50 & 10.85
Simmons, Hall, Miller & Co.	dis 50 & 10
Holmes & Edwards Silver Co.	dis 50 & 10 @ 50 & 10.85

H. & E. Silver Co. Mexican Silver	dis 50.85
H. & E. Silver Co. Durham Silver	dis 50.85
German Silver, Hall & Milton	dis 50
N. & S. Silver	dis 50.85 @ 50.85 & 10.85
Boardman's Flat Ware	dis 50 & 10
Boardman's Nickel Silver	dis 50 & 10
Boardman's Britannia Spoons, case lots	dis 50 & 10
Kill die, Concord, Platform and Half Scroll	dis 60
CHP & Bolster Springs	dis 60 @ 60.85
Squares	
Steel and Iron	dis 75 @ 75 & 10.85
Nickel Plate and Iron	dis 60 & 10 @ 60 & 10.85
Tri Square and T Bevels	dis 45 & 10
Diston's Try Square and T Bevels	dis 45 & 10
Winterbottom's Try and Miter	dis 30 & 10
Staples	
Fence Staples, Galvanized	Same price as Barb Wire
Fence Staples, Plain	See Trade Report
Staple Wires	
Blacksmith's Waterford Goods	dis 30.85 @ 30.85
Lighting Screw Plates	dis 25 @ 25
Reece's New Screw Plates	dis 33 1/2 @ 33 1/2
Stones	
Hindustan No. 1, 3; Axe, 5; Slips No. 1, 5	
Sand Stone	\$ 2.25
Turkey Stone	\$ 1.50
Wasita Stone, No. 1	\$ 1.10
Wasita Stone, No. 2	\$ 1.10
Wasita Slips, No. 1, Extra	\$ 4.00
Wasita Slips, No. 1	\$ 3.00
Arkansas Stone, No. 1, 4 to 6 in.	\$ 1.35
Arkansas Stone, No. 1, 6 to 9 in.	\$ 1.75
Turkey Oil Stone	\$ 1.00
Turkey Slips	\$ 1.00 @ 1.50
Lake Superior, Chase	\$ 1.15
Lake Superior Slips, Chase	\$ 1.15
Seneca Stone, Red Paper Brand	\$ 1.80
Seneca Stone, High Rounds	\$ 2.00
Seneca Stone, Small Whets, gro.	\$ 2.00
Staple Wires	
Joseph Dixon	\$ 20.00, dis 10
Gem	\$ 20.00, dis 10
Jold Medal	\$ 20.00, dis 25
"Mirror"	\$ 20.00, dis 1
Lustro	\$ 20.00, dis 1
Ruby	\$ 20.00, dis 1
Swiss Steel, gro.	\$ 20.00, dis 1
Discon Plumbago	\$ 20.00, dis 1
Boynston's Noon Day, gro.	\$ 20.00, dis 1
Parlor Pride Stove Enamel	\$ 20.00, dis 1
Yates' Liquid	\$ 20.00, dis 1
Yates Standard Paste Polish 10-lb cans, per lb.	\$ 1.50
Japanese	\$ 20.00, dis 1
Firestone	\$ 20.00, dis 1
Diamond O. K. Enamel	\$ 20.00, dis 1
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Swedes Iron Tacks	dis 72 & 10 @ 72
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Tinned Swedes Iron Tacks	dis 72 & 10 @ 72
Tin'd Swedes Iron Upholsterers' Tacks	dis 72 & 10 @ 72
Gimp and Lace Tacks	dis 72 & 10 @ 72
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Swedes Iron Trimmers Tacks	dis 72 & 10 @ 72
Swedes Iron Miners' Tacks	dis 72 & 10 @ 72
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Swedes Steel Tacks, all kinds (Swedes iron price list)	dis 72 & 10 @ 72
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Finishing Nails	dis 72 & 10 @ 72
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Lining and Saddle Nails, list Jan. 1, 1888	dis 72 & 10 @ 72
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Double-pointed Tacks	dis 72 & 10 @ 72
Wire Carpet Nails	dis 72 & 10 @ 72
Wire Brads and Nails	dis 72 & 10 @ 72
Steel Wire Brads, L. & E. Mfg. Co's	dis 72 & 10 @ 72
Tap Borers—Common and Rare	
Ives Tap Borers	dis 72 & 10 @ 72
Enterprise Mfg. Co.	dis 72 & 10 @ 72
Clair	dis 72 & 10 @ 72
Tapers, Measuring—American	dis 72 & 10 @ 72
Spring	dis 72 & 10 @ 72
Chesterman	dis 72 & 10 @ 72
Thermometers—Tin Case	dis 72 & 10 @ 72
Thimble Skeins—See Skeins	
Steel, Ball	dis 72 & 10 @ 72
Steel Wire, Standard list	dis 72 & 10 @ 72
Tinners' Shears, &c.	dis 72 & 10 @ 72
Shears and Snips (P. S. & W.)	dis 72 & 10 @ 72
Punches—See Punches	
Snips, J. Mallinson & Co.	dis 72 & 10 @ 72
Tinware	
Stamped, Japanned & Piced, list Jan. 20, 1887	dis 72 & 10 @ 72
Tire Benders, Upsetters, &c.	dis 72 & 10 @ 72
Stoddard's Lightning Tire Upsetters	dis 72 & 10 @ 72
Detroit Perfected Tire Bender	dis 72 & 10 @ 72
Tobacco Cutters	
Enterprise Mfg. Co. (Champion)	dis 72 & 10 @ 72
Wood Bottom	dis 72 & 10 @ 72
All Iron	dis 72 & 10 @ 72
Nashua Lock Co's	dis 72 & 10 @ 72
Wilson's	dis 72 & 10 @ 72
Clipper (Sargent & Co.)	dis 72 & 10 @ 72
Acme	dis 72 & 10 @ 72
Tramway Lifters	
Wollensack's Patent Iron Bronzed	dis 72 & 10 @ 72
Reiber's Patent Iron Bronzed	dis 72 & 10 @ 72
Reiber's Real Bronze or Nickel Plate, list Jan. 1, 1887	dis 72 & 10 @ 72
Excelsior	dis 72 & 10 @ 72
Shaw's	dis 72 & 10 @ 72
Pavson's Universal	dis 72 & 10 @ 72
Crown and Star	dis 72 & 10 @ 72
Traps	
Newhouse	dis 72 & 10 @ 72
Oneldr, Pattern	dis 72 & 10 @ 72
Game, Blake's Patent	dis 72 & 10 @ 72
Mouse and Rat	
Mouse, Wood Choker	dis 72 & 10 @ 72
Mouse, Round Wire	dis 72 & 10 @ 72
Mouse, Cage, Wire	dis 72 & 10 @ 72
Mouse, Catch-em-alive	dis 72 & 10 @ 72
Mouse, "Romania"	dis 72 & 10 @ 72
Mouse, Delusion	dis 72 & 10 @ 72

Rat, "Decoy".....	gross \$10.00, dis 10
Ideal.....	gross \$10.00, dis 10
Hotchkiss Metallic Mouse, 5-hole traps.....	gross \$10.00, dis 10
In full cases.....	dis 75
Trowels	
Lothrop's Brick and Plastering.....	dis 25
Reed's Brick and Plastering.....	dis 25
Diston's Brick and Plastering.....	dis 25 @ 25.10
Reed's Plastering.....	dis 25
Clement & Maynard's.....	dis 20
Rose's Brick.....	dis 15 @ 20
Brace's Brick.....	dis 25
Worrall's Brick and Plastering.....	dis 20
Garden.....	dis 70
Triflers—Butter and Cheese	
Trucks, Warehouse, &c.....	dis 25
B. & L. Block Co's list, 1887.....	dis 40
Tubes, Boiler.—See Pipe	
Twine	
No. 9, Flax Twine, 4 and 4 1/2 Balls.....	22 1/2 30 1/2
No. 12, " " " " " ".....	21 1/2 28 1/2
No. 18, " " " " " ".....	18 1/2 26 1/2
No. 24, " " " " " ".....	18 1/2 28 1/2
No. 36, " " " " " ".....	18 1/2 27 1/2
No. 24, Mattress, 4 and 4 1/2 Balls.....	45 @ 50
Chalk Line, Cotton 4 1/2 Balls.....	25
Mason Line, Linen.....	55
2 Ply Hemp, 4 and 4 1/2 Balls (Spring Twine).....	11 1/2
3 Ply Hemp, 1 1/2 Balls.....	12 @ 12 1/2
3 Ply Hemp, 1 1/2 Balls.....	11 @ 11 1/2
Cotton Wrapping, 5 Halls to D.....	15 @ 15 1/2
2 3/4 and 5 Ply Jute, 4 1/2 Balls.....	10 1/2
Wool.....	15 @ 15 1/2
Paper.....	15 @ 15 1/2
Cotton Mops—6, 9, 12 and 15 lb to dox.....	15
Vices	
Solid Box.....	dis 50 @ 60 & 10
Washers	
Parallels	
Fisher & Norris Double Screw.....	dis 15 @ 15
Stephens'.....	dis 25 @ 30
Parker's.....	dis 20 @ 25
Wilson's.....	dis 55
Howard's.....	dis 40
Bonney.....	dis 40 @ 10
Millers Falls.....	dis 40 @ 40
Trotter.....	dis 40 @ 40
Merrill's.....	dis 15 @ 20
Sargent's.....	dis 60 @ 10 @ 10
Backus and Union.....	dis 40
Double Screw Lee.....	dis 15 @ 15
Prentiss.....	dis 20 @ 25
Stimpson's Adjustable.....	dis 40
Saw Vices	
Bonney's, Nos. 2 & 3.....	dis \$15.00, dis 4 @ 10
Stearns.....	dis 33 1/2 @ 33 1/2 @ 35
Stearns' Silent Saw Vices.....	dis 33 1/2 @ 35
Sargent's.....	dis 60 @ 10 @ 10
Hopkins.....	dis \$17.50, dis 10
Reading.....	dis 20 @ 20
Combination Hand Vice.....	dis 20 @ 20
Cowell Hand Vices.....	dis 20
Bauer's Vices.....	dis 10
Wagon Boxes	
Per lb.....	dis 25
Wagon Jacks	
Daly.....	dis \$4.00, dis 25
Washer Cutters	
Smith's Patent.....	dis \$12.00, dis 10 @ 10 @ 10
Johnson's.....	dis \$11.00, dis 8 1/2
Penny's.....	dis \$11.00, dis 55
Appleton's.....	dis \$11.00, dis 10
Bonney's.....	dis 10 @ 10
Washers	
Size.....	4 5-16 3/4 1/2 3/4 1/2
In lots less than 200 lb, add 1/4 lb, add 3/4 lb boxes 1¢ to list	
Wedges.—Iron	
Steel.....	dis 3 1/2
Well Buckets, Galvanized	
Hill's.....	dis 12 qt., \$4.25; 14 qt., \$5.25
Iron Glad.....	dis 14 qt., \$4.25 @ \$4.50
Whiting's Wire Iron Band.....	dis 12 qt., \$4.25 @ \$4.50
Whiting's Wire Top.....	dis \$4.00 @ \$4.25
Well Wheels—8 in., \$2.25; 10 in., \$2.70; 12 in., \$3.75	
Wire	
Iron	
Market, Br. & Ann., Nos. 0 to 18.....	dis 75 @ 75 @ 5
Market, Copp red, Nos. 0 to 18.....	dis 70 @ 70 @ 10
Market, Galvanized, Nos. 0 to 18.....	dis 65 @ 10
Market, Tin'd, Tinned list Nos. 0 to 18.....	dis 67 1/2 @ 67 1/2 @ 5
Stone Br. & Ann'd, Nos. 16 to 18.....	dis 72 1/2 @ 75 @ 5
Stone, Bright & Ann'd, Nos. 19 to 28.....	dis 75 @ 75 @ 10
Stone Br. & Ann'd, Nos. 27 to 36.....	dis 75 @ 10 @ 80
Stone, Tin'd, Tinned list, Nos. 18 to 36.....	dis 70 @ 10 @ 75
Tinned Broom Wire, Nos. 18 to 24.....	dis 72 1/2 @ 75
Galvanized Fence.....	dis 65 @ 65 @ 5
Annueated Fence, Nos. 8 & 9.....	dis 72 @ 75 @ 5
Annueated Grape, Nos. 10 to 14.....	dis 75 @ 75 @ 5
Brass, tin'd, Jan. 1884.....	dis 35 @ 33 1/2
Copper, tin'd, Jan. 1884.....	dis 35 @ 33 1/2
Baltimore.....	See Trade Report
Wire on Spools.....	dis 65
Malin's Brass and Tinned Wire on Spools.....	dis 40
Malin's Steel and Copper Wire on Spools.....	dis 30
Cast Steel Wire.....	dis 30
Subs Steel Wire.....	dis 30 @ 30
Galvanized Wire, Nos. 18 to 30.....	dis 15 @ 15
Picture Wire.....	dis 60 @ 10
Barb Wire Safety Guards.....	dis 1000 \$2.00, dis 10
Wire Clothes Lines See Lines.....	
Wire Cloth, Netting, &c.	
Painted Screen Cloth, No. 34, 100 sq. ft.....	\$1.90
Painted Screen Cloth, No. 33, 100 sq. ft.....	\$2.00
Galvanized Wire Netting.....	dis 10 @ 10 @ 10
Galvanized Wire Netting.....	dis 10 @ 10 @ 10
Wire Rope.—See Pig Wire Goods.....	
Wire Rope.—List May 1, 1886.....	dis 33 1/2
Wrenches.—American Adjustable	
Baxter's Adjustable "8".....	dis 40 @ 40 @ 50
Baxter's Diagonal.....	dis 40 @ 40 @ 50
Cox's Genuine.....	dis 50 @ 50
Cox's Standard.....	dis 50 @ 50
Cox's Standard.....	dis 70 @ 10
Lamson & Sessions' Engineers.....	dis 60 @ 10
Lamson & Sessions' Standard.....	dis 70 @ 10
Cox's Pattern, Wrought.....	
Girard Agricultural.....	dis 80 @ 80 @ 5
Lamson & Sessions' Agricultural.....	
Sterling Wrought.....	
Bemis & Call's Patent Combination.....	dis 35
Bemis & Call's Merrick's Pattern.....	dis 35
Bemis & Call's Ryger's Patts.....	dis 35
Bemis & Call's Cylinder or Gas Pipe.....	dis 40 @ 5
Bemis & Call's No. 8 Pipe.....	dis 35 @ 5
Atkins' Pocket Bright.....	dis 40 @ 5
Atkins' Pocket Bright.....	dis 40 @ 5
Webster's Patent Combination.....	dis 35
Boardman's.....	dis 2 @ 35
Always Ready.....	dis 25 @ 5
Alligator.....	dis 50
Donohue's Engineer.....	dis 50
Acme, Bright.....	dis 40 @ 5
Acme, Buckle.....	dis 10 @ 25
Walker.....	dis 50 @ 5
Diamond.....	dis 40
Diamond Patent Steel.....	dis 40
Wringers, Clothes	
List Jan. 10, 1884.....	\$5.00
Wrenches	
Stevens Hooks, &c., Jan. 13, 1887.....	dis 30 @ 30 @ 5

CURRENT METAL PRICES.

AUGUST 15, 1888.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market reports.

IRON AND STEEL.

Bar Iron from Store.

Common Iron:	
3/4 to 2 in. round and square.	per lb 1.90 @ 2.00¢
1 to 6 in. x 3/4 to 1 in.	
Refined Iron:	
3/4 to 2 in. round and square.	per lb 2.10 @ 2.25¢
1 to 4 in. x 3/4 to 1 1/2 in.	
4 1/2 to 6 in. x 3/4 to 1 in.	
1 to 6 in. x 3/4 and 5-16	per lb 2.30 @ 2.45¢
Rods—3/4 and 1 1/2 round and sq.	per lb 2.30 @ 2.35¢
Bands—1 to 6 x 3 16 to No. 12	per lb 2.30 @ 2.45¢
"Hurdens Best" Iron, base price	per lb 3.00 @
Bureau's "H. B. & S." Iron, base price	per lb 2.80 @
"Uster"	per lb 3.10 @
Norway Rods	per lb 4.00 @ 5.00¢

Merchant Steel from Store.

Open-Hearth and Bessemer Machinery,	
Toe Calk, Tire and Sleigh Shoe, base price in small lots.	24¢ @ 3¢
Best Cast Steel, base price in small lots	8 1/2¢ @ 9¢
Best Cast Steel Machinery, base price in small lots	5 1/4¢ @ 6¢

For Classification and Extras adopted by the Merchant Steel Association of the United States, June 1, 1888, see *The Iron Age*, June 21, 1888.

Sheet Iron from Store.

Common American.	R. G. Cleaned.
10 to 16	per lb 2.75 @ 2.80¢
17 to 20	per lb 2.85 @ 3.00¢
21 to 24	per lb 3.00 @ 3.10¢
25 and 30	per lb 3.20 @ 3.50¢
27	per lb 3.37 1/2¢ @ 3.75¢
28	per lb 3.50 @ 4.00¢
B. P.	2d qual.
Galv'd. 14 to 20	per lb 4.50 @ 4.80¢
Galv'd. 1 1/2 to 24	per lb 4.75 @ 5.00¢
Galv'd. 25 to 30	per lb 5.25 @ 5.50¢
Galv'd. 27	per lb 5.62 1/2¢ @ 5.80¢
Galv'd. 28	per lb 6.00 @ 5.80¢
Patent Planished	per lb A 10¢ B 9¢
Russia	per lb 9 1/4¢ @ 10¢
American Cold Rolled B. B.	per lb 5¢ @ 7¢

English Steel from Store.

Best Cast	per lb 15¢
Extra Cast	per lb 16 1/2¢ @ 17¢
Swaged, Cast	per lb 16¢
Best Double Shear	per lb 15¢
Blister, 1st quality	per lb 12 1/2¢
German Steel, Best	per lb 10¢
2d quality	per lb 9¢
3d quality	per lb 8¢
Sheet Cast Steel, 1st quality	per lb 15¢
2d quality	per lb 14¢
3d quality	per lb 12 1/2¢

METALS.

Tin.

Hanca, Pigs	per lb 24¢
Straits, Pigs	per lb 24¢
English, Pigs	per lb 24¢
Straits in Bars	per lb 25¢

Tin Plates.

Charcoal Plates.—Bright.	Per box.
Melyn Grade	per box \$5.75 @ \$6.00
" "	per box 6.10 @ 6.25
" "	per box 6.50 @ 6.60
" "	per box 12.25 @ 12.50
" "	per box 7.25 @ 7.50
" "	per box 7.50 @ 7.75
" "	per box 7.25 @ 7.50
" "	per box 15.25 @ 15.50
" "	per box 5.50 @ 5.75
" "	per box 7.00 @ 7.25
Calland Grade	per box \$6.00
" "	per box 6.25
" "	per box 6.00
" "	per box 7.50
" "	per box 7.75
" "	per box 7.50
Allaway Grade	per box \$5.25 @
" "	per box 5.50 @
" "	per box 5.25 @
" "	per box 10.75 @
" "	per box 6.25 @
" "	per box 6.50 @
" "	per box 6.25 @
" "	per box 12.50
" "	per box 5.00 @
" "	per box 6.00 @

Coke Plates.—Bright.

Steel Coke.—IC, 10 x 14, 14 x 20	per box \$4.80 @
" "	per box 7.50 @ 7.65
" "	per box 10.00 @ 10.15
IX, 10 x 14, 14 x 20	per box 5.65
BV Grade.—IC, 10 x 14, 14 x 20	per box 4.70 @

Charcoal Plates.—Terne.

Dean Grade.—IC, 14 x 20	per box \$4.62 1/2 @
" "	per box 9.25 @
IX, 14 x 20	per box 5.62 1/2 @
" "	per box 11.37 1/2 @
Abecarne Grade.—IC, 14 x 20	per box 4.50 @
" "	per box 9.00 @
IX, 14 x 20	per box 5.50 @
" "	per box 10.80

Tin Boiler Plates.

IXX, 14 x 20	per box 112 sheets \$12.50 @ \$12.75
IXX, 14 x 28	per box 112 sheets 12.75 @
IXX, 14 x 31	per box 112 sheets 14.25 @

Copper.

Duty: Pig. Bar and Ingots. 4¢: Old Copper, 3¢	
per lb. Manufactured (including all article of which Copper is a component of chief value), 4 1/2 ¢ ad valorem	

Ingot.

Lake	per lb 17 1/2¢
"Anchor" Brand	per lb @

Prices adopted by the Association of Copper Manufacturers of the United States, December 10, 1887, being quotations for all sized lots.

Not wider than	Not longer than	And longer than	Over 61 oz.	32 to 64 oz.	16 to 32 oz.	14 to 16 oz.	12 to 14 oz.	10 to 12 oz.	8 to 10 oz.	Less than 8 oz.
30—72—			25	25	25	26	27	28	31	33
31—72—			25	25	25	26	27	28	30	34
36—96—			25	25	25	27	29	33	36	
36—96—			25	25	25	28	30	34	38	
48—96—			25	25	27	29	31	35		
48—96—			25	25	28	30	32	36		
60—96—			25	25	30	32				
60—96—			25	26	31					
84—96—			26	27						
84—96—			27	28						
Over 84 in. wide			28	30						

All Bath Tub Sheets..... 16 oz. 14 oz. 12 oz. 10 oz.
Per pound..... \$0.28 0.30 0.32 0.35
Bolt Copper, 3/4 inch diameter and over, per pound..... 25¢

Circles, 60 inches in diameter and less, 3 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 60 inches diameter, up to 96 inches diameter inclusive, 5 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles, over 96 inches diameter, 6 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Segment and Pattern Sheets, 3 cents per pound advance over price of sheets required to cut them from.

Cold or Hard Rolled Copper, 14 ounces per square foot and heavier, 1 cent per pound over the foregoing prices.

Cold or Hard Rolled Copper, lighter than 14 ounces per square foot, 2 cents per pound over the foregoing prices.

Copper Bottoms, Fits and Flats.

14 ounce to square foot and heavier..... 3¢

12 ounce and up to 14 ounce to square foot..... 2 1/2¢

10 ounce and up to 12 ounce..... 3¢

Circles less than 8 inches diameter 2 cents per pound additional.

Circles over 13 inches diameter are not classed as Copper Bottoms.

Tinning.

Tinning sheets on one side, 10, 12 and 14 x 48 each..... 8¢

Tinning sheets on one side, 30 x 60 each..... 30¢

For tinning boiler sizes, 9 in. (sheets 14 in. x 60 in.), each..... 15¢

For tinning boiler sizes, 8 in. (sheets 14 in. x 56 in.), each..... 12¢

For tinning boiler sizes, 7 in. (sheets 14 in. x 52 in.), each..... 12¢

Tinning sheets on one side, other sizes, per square foot..... 2 1/2¢

For tinning both sides double the above prices.

Planished Copper.

Planished Copper List May 5, 1888..... Net

Brass and Copper Tubes.

Seamless Copper..... 50¢

Seamless Brass..... 47¢

1/2 inch per lb..... 44¢

3/4 " "..... 42¢

1 " "..... 40¢

1 1/4 " "..... 38¢

1 3/4 " "..... 36¢

2 " "..... 34¢

2 1/2 " "..... 32¢

3 " "..... 30¢

Roll and Sheet Brass.

Discount from list..... 10 @ 15 %

Spelter.

Duty: Pig. Bars and Plates, \$1.50 per 100 lb..... 5 1/4¢

Western Spelter..... 5 1/4¢

"Berghport"..... 5 1/4¢

"Bertha"..... 7 1/4 @ 8¢

Zinc.

Duty: Sheet, 2 1/4¢ per lb..... 6 1/2¢

600 lb casks..... 6 1/2¢

Per lb..... 11 1/4¢

Lead.

Duty: Pig. \$2 per 100 lb. Old Lead, 2¢ per lb. Pipe and Sheets, 3¢ per lb..... 4 1/4 @ 5¢

American..... 4 1/4 @ 5¢

Newark..... 4 1/4 @ 5¢

Bar..... 3 1/4¢

Pipe, subject to trade discount..... 6 1/4¢

Tin-Lined Pipe, subject to trade discount..... 15¢

Block Tin Pipes, subject to trade discount..... 40¢

Sheet, subject to trade discount..... 7 1/4¢

Solder.

1/2 @ 3/4 (Guaranteed)..... 15¢

Extra Wiping..... 13¢

The prices of the many other qualities of Solder in the market indicated by private brands vary according to composition.

Antimony.

Cockson..... per lb 18 1/2 @ 14¢

Wentworth's..... 11 1/4¢

Plumbers' Brass Work.

Ground Bibbs and Stops..... Discount per cent.

Ground Stops, Hydrant Cocks, &c..... 55¢ 10¢ 2

Corporation Cocks..... 55¢ 10¢ 2

Corporation Cocks, "Mueller" Pattern, from

Western list.....	55¢ 10¢ 2
Ground Basin and Shampooing Cocks.....	50¢ 10¢ 2
Compression Basin Cocks.....	50¢ 10¢ 2
Compression Basin and Sink Cocks.....	50¢ 10¢ 2
Compression Pantry Cocks.....	50¢ 10¢ 2
Compression Double Basin and Shampooing Cocks.....	50¢ 10¢ 2
Compression Double Bath Cocks.....	50¢ 10¢ 2
Compression Bibbs, Urinal Cocks, all Cocks, Stops, Hopper Cocks, Hydrant Cocks and Ball Cocks.....	50¢ 10¢ 2
Basin Plugs and Basin Grates.....	55¢ 10¢ 2
Bath and Wash Trays Plugs.....	55¢ 10¢ 2
Bath Wastes and Washers, Bath and Basin Valves, Sewer and Vacuum Valves, Cistern Valves, Pump Valves and Strainers, Ship Closet Valves and Suction Baskets.....	55¢ 10¢ 2
Basin Clamps, Basin Joints and Strainers.....	55¢ 10¢ 2
Boiler Couplings, Ground Face, per set \$1.25.....	dis 10
Boiler Couplings, Plain Face, per set \$1.20.....	dis 10
Water Back Valve and Plain Couplings, Soldering Nipples and Unions.....	55¢ 10¢ 2
Union Joints.....	55¢ 10¢ 2
Hydrant Nozzles, Handles and Guides, Sockets and Clamps, Street Washer Screws and Guides.....	55¢ 10¢ 2
Hose Goods.....	55¢ 10¢ 2

Steam and Gas Fitters' Brass and Iron Work.

Discount per cent.	
Brass Globe Valves.....	60¢ 10¢ 2
Finish'd Brass Globe Valves, with Finish'd Brass Wheels.....	40¢ 10¢ 2
Brass Globe Valves, with Patent Wood Wheels.....	60¢ 10¢ 2
Brass Globe Angle and Corner Valves.....	60¢ 10¢ 2
Brass Radiator Angle Valves.....	60¢ 10¢ 2
Brass Radiator Angle Valves Frink's Patent.....	60¢ 10¢ 2
Brass Cross and Check Valves.....	60¢ 10¢ 2
Brass Check Valves.....	60¢ 10¢ 2
Brass Hose Valves.....	60¢ 10¢ 2
Brass and Iron Frink Valves.....	60¢ 10¢ 2
Brass Safety Valves.....	60¢ 10¢ 2
Brass Vacuum Valves.....	50¢ 10¢ 2
Brass Whistle Valves.....	60¢ 10¢ 2
Brass Balance, Back Pressure and Foot Valves.....	50¢ 10¢ 2
Brass Butterfly and Throttle Valves.....	50¢ 10¢ 2
Brass Pump Valves.....	50¢ 10¢ 2
Brass Steam Cocks.....	57 1/2¢ 10¢ 2
Brass Service, Meter and Union Meter Cocks.....	57 1/2¢ 10¢ 2
Brass Whistles, Water Gauges and Oil Cups.....	60¢ 10¢ 2
Brass Hollow Plug, Tallow and Globe Oil Cups.....	50¢ 10¢ 2
Brass Lubricators.....	60¢ 10¢ 2
Brass Air Valves.....	60¢ 10¢ 2
Brass Air Cocks.....	60¢ 10¢ 2
Brass Gauge Cocks.....	55¢ 10¢ 2
Brass Cylinder Cocks and Steam Bibbs.....	50¢ 10¢ 2
Brass Swing Joints and Expansion Joints.....	50¢ 10¢ 2
Brass Test Pumps.....	50¢ 10¢ 2
Brass Steam Fittings, Rough.....	60¢ 10¢ 2
Brass Steam Fittings, Finished.....	2 10¢ 2
Brass Union Joints.....	60¢ 10¢ 2
Brass Soldering Unions and Nipples.....	55¢ 10¢ 2
Brass Hose Fittings, Fusible and Boiler Plugs.....	55¢ 10¢ 2
Iron Body Globe, Angle, Cross and Check Valves.....	65¢ 10¢ 2
Iron Body Safety, Throttle, Back Pressure, Butterfly and Foot Valves.....	65¢ 10¢ 2
Iron Cocks, all Iron.....	65¢ 10¢ 2
All Iron Valves.....	65¢ 10¢ 2

Miscellaneous.

Discount per cent.	
Cast Iron Fittings.....	70¢ 10
Plugs and Bushings.....	75¢ 10
Malleable Iron Unions.....	67 1/2¢
Malleable Iron Fittings.....	67 1/2

Paints.

Black, Lamp—Coach Painters'.....	per lb 22 @ 24¢
" " Ordinary.....	6¢
Black, Ivory Drop, fair.....	12 @ 15¢
" " best.....	20¢
Black Paint, in oil, kegs, 8¢; assorted cans, 11¢	
Blue, Prussian, fair to best.....	40 @ 55¢
" " in oil.....	45 @ 55¢
" " Chinese dry.....	18 @ 70¢
" " Ultramarine.....	18 @ 30¢
Brown, Spanish.....	14¢
" " Van Dyke.....	10 @ 12¢
Dryers, Patent American, ass'd cans, 9¢; kegs 7¢	
Green, Chrome.....	15 @ 23¢
Green, Chrome in oil.....	14 @ 18 @ 25¢
Green, Paris.....	good, 20¢; best, 25¢
Green, Paris in oil.....	good, 30¢; best, 35¢
Iron and Bright Red.....	per lb 24 1/2¢
Iron Paint, Brown.....	per lb 15¢
Iron Paint, Purple.....	per lb 30¢
Iron Paint, Ground in oil, Bright Red.....	per lb 61¢
Iron Paint, Ground in oil, Red.....	per lb 54¢
Iron Paint, Gr. and in oil, Brown.....	per lb 54¢
Iron Paint, Ground, Purple.....	per lb 6¢
Litharge.....	61¢
Mineral Paints.....	2 @ 4¢
Orange Mineral.....	10¢
Red Lead, American.....	61¢
Red Venetian (Eng.) dry.....	\$1.65 @ \$1.70
Red Venetian in oil.....	ass'd cans, 11¢; kegs, 8¢
Red Indian Dry.....	9 @ 12¢
Rose Pink.....	10 @

THE IRON AGE

THURSDAY, AUGUST 23, 1888.

Improved Diamond Prospecting Drills.

An improved form of diamond prospecting drill is now being put on the market by the American Diamond Rock Boring

respectively. The diamonds of the first-mentioned row cut the path of the drill in its forward progress, while those upon the outer and inner periphery of the tool enlarge the cavity around the same, and admit the free ingress and egress of the water. The bit is screwed to the core-barrel or spiral grooved guide, and this to the drill rods, which are made of heavy lap-weld tubing, and added section after section, as the hole deepens. When the drill-rods, with bit attached, are rotated and fed forward, the bit passes into the rock, cutting an annular channel. That portion of the stone encircled by this channel is, of course, undisturbed, and the core-barrel passing down over this keeps it intact until the rods are withdrawn, when the solid cylinder thus formed is brought up with them, a "core-lifter"

double cylinder reversible engine, mounted either on bed-plate or an upright or horizontal tubular boiler. The capacity of the engine varies according to the depth and size of the hole which the drill is required to bore.

Fig. 1 represents a front view of what is known as the No. 3 drill. It is operated by regular reciprocating engines, with cross-head and steel connecting rods and simple reversing arrangement. The valve motion is on the regular plan for hoisting or locomotive engines. The driving gears are of composition metal, and the engines can be run at a very high rate of speed, without vibration. Hydraulic feed is employed, replacing the differential feed on the boiler machines. By this the feed motion is accomplished, as its name indicates, by hydraulic pressure, through the

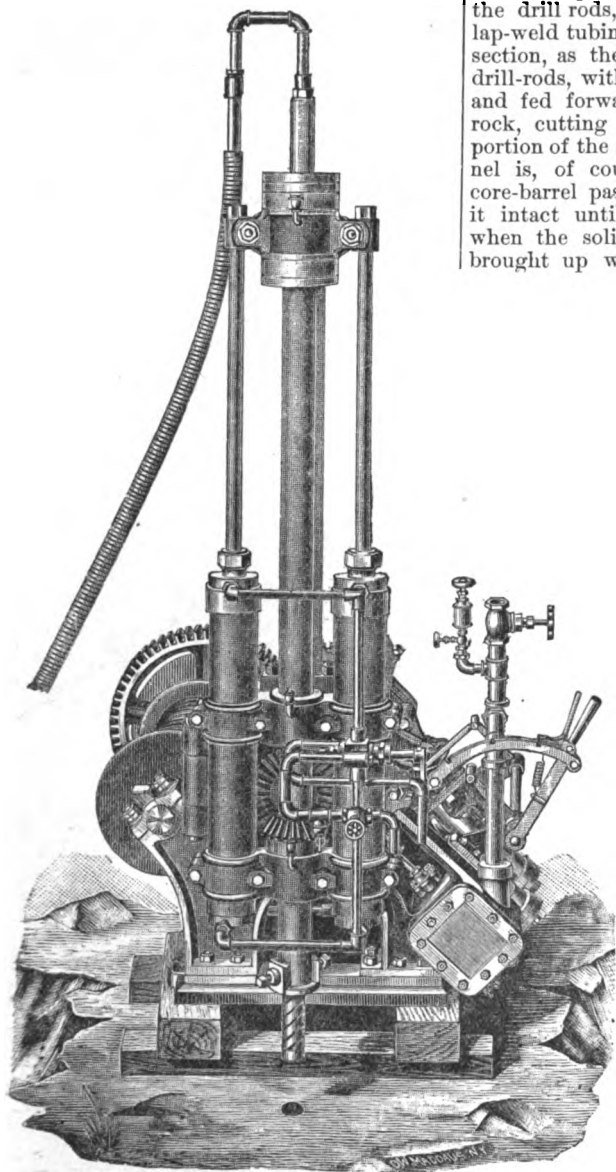


Fig. 1.—Front View.

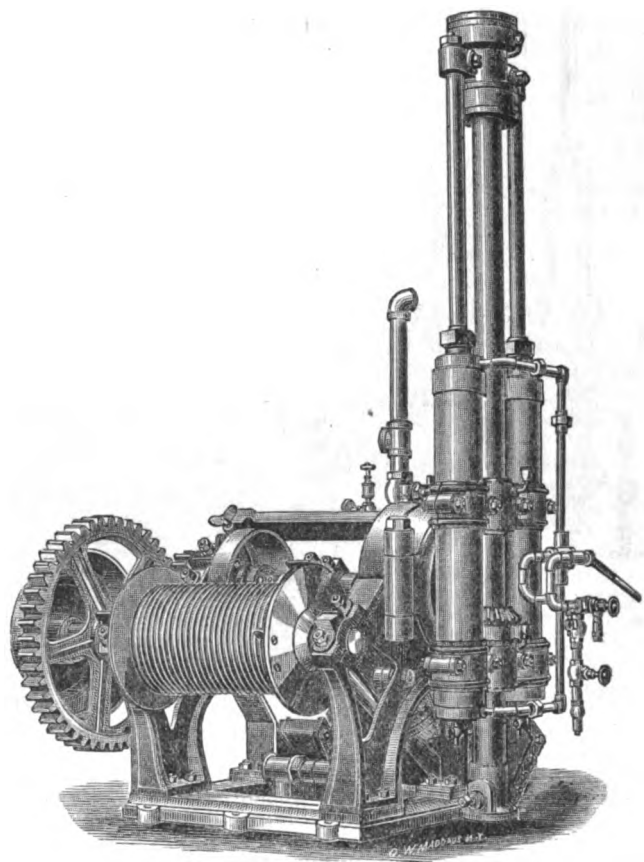


Fig. 2—Side View.

IMPROVED DIAMOND PROSPECTING DRILL, BUILT BY THE AMERICAN DIAMOND ROCK BORING CO., N. Y.

Company, 15 Cortlandt street, New York, the engravings in this impression illustrating its main features.

It may not be without interest to explain here that the principle of the diamond drill lies, first, in the rapid rotation of a hollow "bit," of which the cutting edges are the diamonds, set up in such a manner that they are the only parts of the tool that come in contact with the rock; and second, in forcing a stream of water down through the interior of this bit, passing up outside of it and carrying away the material ground up by the diamonds. The hollow bit is a steel thimble, having three rows of diamonds (bort or carbon) embedded in it, so that the edges of those in one row project from its face, while the edges of those in the other two rows project from the outer and inner periphery

breaking it at the bottom of the hole and securely wedging it in the core-barrel.

At the upper end of the drill-rods is a water swivel, with connection with the steam pump. By means of this pump a constant stream of water is forced down through the hollow drill-rod, keeping the bit cool and the hole clear of sediment, which is forced by the water pressure up the outside of the rods to the surface. When a core is not required a solid bit may be used, the detritus being washed out by the water, as when boring with the annular bit. These general principles of boring with the diamond drill are always the same, the different machines, by comparatively slight changes, being applicable to any kind of rock drilling. For deep boring, for wells or for prospecting mineral lands we use a machine with

medium of two small cylinders and pistons, the piston rods being connected by a suitable cross-head to the plain hollow spindle, which carries the drill rod. Both ends of the hydraulic cylinders are connected by a system of pipes and hose to the pumps that supply the water necessary in drilling with the diamond bit. The quantity of water admitted to the cylinders is controlled by a four-way cock, which also admits water to either end of the cylinders, as the operator may require. Thus, it will be readily understood, the amount of pressure on the bit is directly under the control of the operator, and only limited by the water pressure from the supply pumps, the range being, in ordinary cases, from nothing up to 4000 pounds. The changes through the whole range of pressure, and also the reversing of the motion

of the feed, are accomplished by simply moving a small lever, while the machine is running at full speed. A pressure gauge is placed on the pipe leading to the hydraulic cylinders, so that the operator can at all times just see how much pressure there is on the bit. With any constant pressure this feed gives a very perfect automatic adjustment of the speed with which the drill is fed forward, the rate of progression depending upon the hardness of the material, being from frequently less than 1 inch per minute in very hard rock, to over 2 feet per minute in a soft substance like coal. This carries the additional advantage with it, that the operator, after some experience, can, by comparing the pressure shown by the gauge with the rate of penetration of the drill,

the stratification and character of the mine or quarry at any depth. The No. 1 drill which the company build is the same as that just described, but is mounted on a carriage with a boiler outfit. The bit is 2 inches in diameter, and the core $1\frac{1}{4}$ inches. The weight of the No. 3 machine is 1800 pounds, the heaviest piece weighing about 250 pounds.

In Fig. 4 we show an underground prospecting and mining drill, which will bore a $1\frac{1}{2}$ -inch hole 250 feet in any direction, taking out a 1-inch core. This drill can be run either by steam or compressed air, and is especially valuable in sinking shafts, driving tunnels, or in any possible position where any kind or style of drill can be used. In underground prospecting its lightness, combined with ease of man-

sudden strain upon the cutting points incidental to drilling through soft into hard rock is thus avoided.

The tubular drill-rod passes through the screw-shaft, and is held firmly by a chuck, the motion of the screw-shaft being thus communicated to the drill-rods and bit. In order to run the screw-shaft back after it has been fed forward its full length, it is only necessary to release the chuck and to loosen the nut on the frictional gear, thus allowing the gear to run loose; then the screw-shaft will run up with the same motion which carried it down, but with a velocity 60 times greater. The chuck and nut are then tightened, giving the screw-shaft a grip on the drill-rod in a new place, and the drill is ready for another run. The drill-rods may be extended to

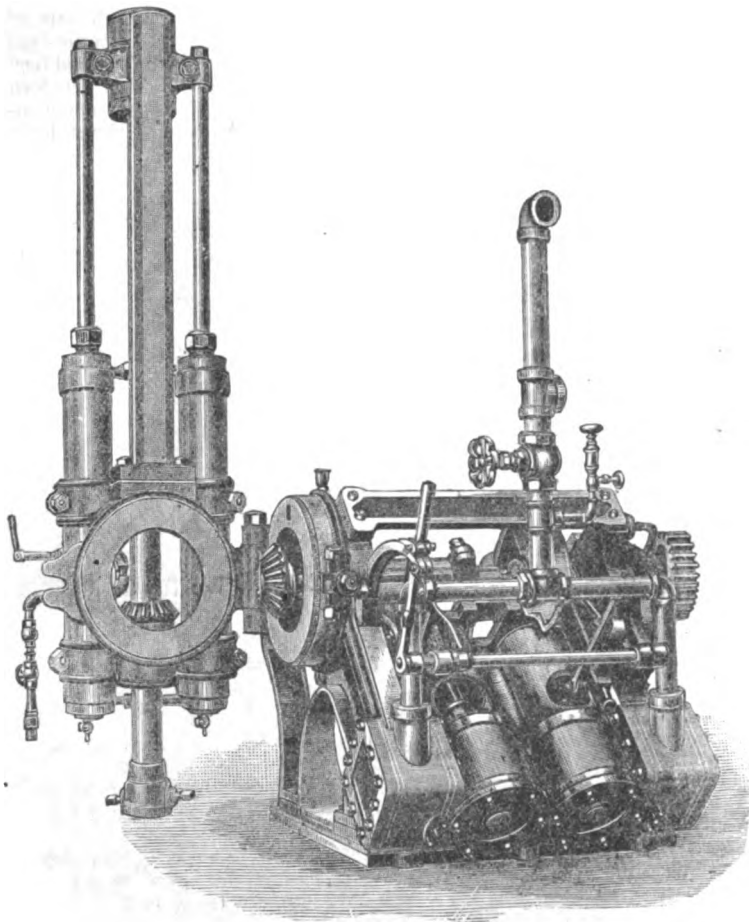


Fig. 3.—Drill with Hinged Swivel Head Open.

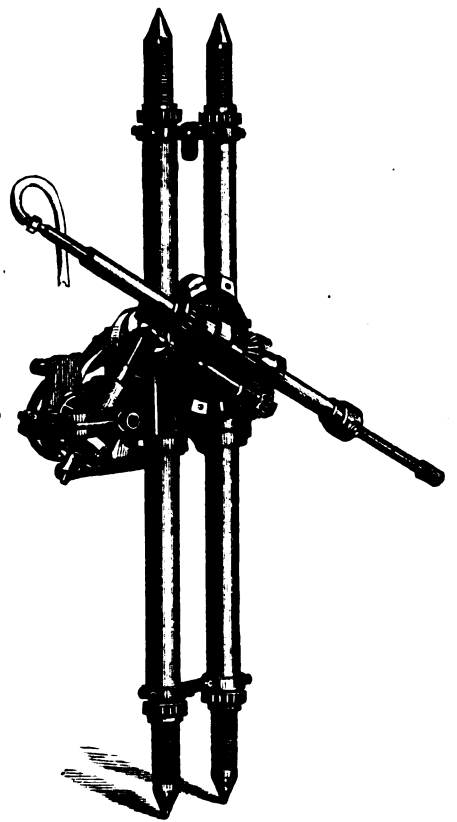


Fig. 4.—Underground Prospecting and Mining Drill.

IMPROVED DIAMOND PROSPECTING DRILL, BUILT BY THE AMERICAN DIAMOND ROCK BORING CO., N. Y.

tell about what kind of material the bit is boring through and can make use of the knowledge thus obtained, either for speed or for safety.

The swivel-head is hinged and so arranged that by simply loosening one bolt it can be opened and swung out of the way when withdrawing the drill rods from the bore hole or replacing them in it. This will be more clearly understood from Fig. 3. It can also be turned or "swiveled" so as to adjust the spindle for boring vertically, horizontally or at any desired angle. The large hoisting-drum is fitted for wire rope, and is capable of handling 1000 feet of drill rods with a single whip. A slip drum is attached to same shaft for use in driving casing.

The drill will bore vertically, horizontally or at any angle, to a depth of 1000 feet, taking out a core or sample of the rock penetrated. These samples are not disintegrated fragments of rock, but continuous solid cylinders, showing clearly

agement, makes it particularly valuable. A differential feed is employed. For this purpose the machine is fitted with a grooved screw-shaft, feathered to the lower sleeve gear. This is a double gear, connecting by its upper teeth with a beveled driving gear, and by its lower teeth with the release gear—a frictional gear at the bottom of the short feed-shaft. At the upper end of the feed-shaft another gear is feathered, connecting with an upper gear on the screw-shaft. This last gear is attached to the feed-nut, in the thread of which runs the screw of the screw-shaft, and, as the gear of the feed shaft has one or more teeth than that of the feed-nut, the nut makes fewer revolutions in a given time than the screw-shaft, thus producing the differential feed. The frictional gear on the bottom of the feed-shaft combines with this a frictional feed, making the drill sensitive to the character of the rock through which it is passing by maintaining a uniform pressure. The severe and

any desired length by simply adding fresh pieces of tubing, the successive lengths being quickly coupled together. In order to secure compactness the driving cylinders are of the oscillating type. The drill is a convenient tool, and for many purposes will be found to be of great value.

The specific heat of air at constant pressure being 0.2377, the specific heat of water, which is 1, is therefore 4.1733 times greater under ordinary circumstances. A pound of water losing 1° of heat, or 1 thermal unit, will consequently raise the temperature of 4.17 pounds, or, at ordinary temperatures, say 50 cubic feet of air, 1° . A pound of steam at atmospheric pressure, having a temperature of 212° F., in condensing to water at 212° F., yields 965.7 thermal units, which, if utilized, would raise the temperature of $5 \times 965.7 = 48,285$ cubic feet of air 1° , or about 690 cubic feet from 0° to 70° F.

Adjustable Clamping Blocks.

The Energy Mfg. Company, 1115-1123 South Fifteenth street, Philadelphia, Pa., are bringing out a new clamping block for securing work on planers, shapers, drills, boring machines, &c. The engraving, which we annex, represents a section of a planer with the clamps holding a piece of work to the table. It will be noticed that instead of using wooden pieces and scrap, to fill under the outer ends of clamps, adjustable clamp blocks are used which have teeth and are bolted together. This prevents their giving, no matter how much strain is brought upon them by the clamp bolts. The blocks can be used in a number of places to advantage, and will save considerable time. They are made in four sizes.

Cost of Importing Tin Plate.

Some time ago a correspondent suggested to us the advisability of publishing in our columns a set of rules, with tables and other data, for figuring from the English quotations the cost in American

add 3 per cent. to cover the insurance, consular charges, &c., and the sum will be the cost of the plates on ship at Liverpool. The next item to take into account is the ocean freight, which is of course a variable factor depending upon the current rates, and also upon the ship, the "tramp" steamers charging less than the regular Transatlantic liners. At present the freight rates are from 8/6 to 9/ per ton, but within four years they have been as high as 16/ Having made proper allowance for the cost of carriage, there remains the duty, which is 1 cent a pound. This scheme of estimating assumes that the plates were bought for cash in England, which would necessarily be the case unless the buyer had an established credit abroad. If bought on time interest would, of course, have to be added. We believe, however, that it is the invariable rule in the tin-plate trade for the importer to pay cash, though the consumer who buys the plates from him in this country gets credit.

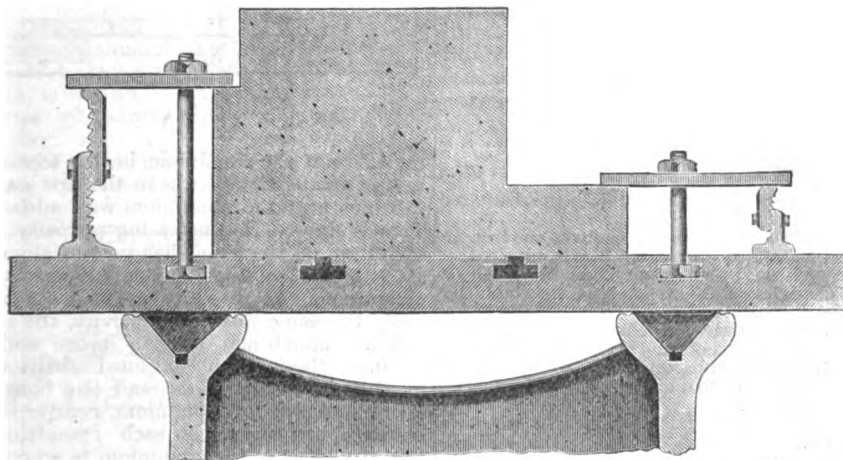
To illustrate by a practical example, let us assume that a consumer wishes to purchase 500 boxes IC 14 x 20 Bessemer steel plates, coke finish. At 13/ per box, f.o.b.

1 per cent. and figuring on 10 per cent. above the cost of the plates, or \$1674.82, we find it to be \$8.37; adding this to \$1539.02 we find the cost of the plates insured to be \$1547.39. As mentioned above the freight rates vary according to circumstances, but 9/ per ton of 2240 pounds may be taken as the current charge. The gross weight of the 500 boxes, at 120 pounds per box, will be 60,000 pounds, or, say, 27 tons, which, at 9/ per ton, cost 243/, or about \$60; adding this to the cost of the insured plates we get \$1607.39 as the cost of the plates on dock at New York. Though the plates are now in this country the purchaser cannot obtain them until he has settled with the custom house. To avoid the trouble of attending in person to the payment of duties it is usual to employ a custom house broker who will charge, say, \$3.50 irrespective of the value of the invoice. It may be mentioned that this is a low charge for brokerage, it being \$5 at the other ports of entry. The 14 x 20 IC plates weigh about 108 pounds net to the box, and as the tariff is 1 cent per pound, the duty on the lot will be \$540, or \$543.50 with the brokerage, no account being taken of certain minor custom house fees. Adding this to \$1607.39, the cost of the plates on dock, we find the total cost of 500 boxes IC 14 x 20 Bessemer cokes, delivered on dock in New York, to be \$2150.89, or \$4.30 per box. At 13/ per box Liverpool the plates were worth in our currency, say, \$3.17, so that the total charge per box of importing was \$1.13, or about 35½ per cent. on the quoted foreign price. We would not have our readers take the above example as a reliable guide, for apart from the varying freight, insurance and other charges, there are a number of expense items which it would be impossible to correctly allow for in a suppositive case, but which must always be met in an actual business transaction. Not to mention the trouble involved, which ought to be entered at a cash valuation, there is the general item of interest, which cannot be definitely specified.

Furthermore, there is no account taken of possible delays, or perhaps it would be nearer the truth to say probable delays—and, finally, if the plates are not of a satisfactory quality, the individual buyer has no foreign agents or correspondents through whom he can obtain redress. A company whose sole business is the importation of tin plates of course "know the ropes" perfectly, but to a novice in the trade these same "ropes" will present an inextricable tangle. The example we gave was made as simple as possible, being a single large order for one grade of plates, but where a buyer wanted several kinds of plates, or maybe only a few boxes, the trouble and expense of importing direct would be proportionately increased.

Steel rails weighing 90 pounds per yard have recently been rolled by the Bethlehem Iron Company, of Bethlehem, Pa., for use on the Reading Railroad. These are said to be the heaviest steel rails ever rolled in this country. It is rumored that both the Reading and Jersey Central roads are going to renew the track on their main lines across New Jersey with steel rails weighing from 89 to 92 pounds per yard.

A joint committee of the City Council and the Board of Trade of Akron, Ohio, made a tour of investigation to ascertain what system would best be suitable to provide the city with gas for fuel and lighting. They looked into the Westinghouse, Loomis and Archer systems, and their report, an interesting document, which is favorable to the Loomis system, has been printed in pamphlet form, by T. William Harris & Co., of 44 Broadway, this city, who are builders of the Loomis plant.



ADJUSTABLE CLAMPING BLOCKS, MADE BY THE ENERGY MFG. CO., PHILADELPHIA, PA.

currency of tin plates laid down in this country, allowances being made for all ordinary charges, such as commissions, freights, &c. At first sight this appears to be a very simple problem, but a little investigation will soon discover its difficulties. Many a large consumer of tin plates, in the hope of saving money, has attempted to import his plates direct, but we do not know of a single instance where the experiment has proved a success, or, if fortunate enough to obtain his plates at prices a little under the jobbers' quotations, the troubles, delays and vexations experienced have far more than outweighed the little money gain, and rarely if ever has the consumer been tempted a second time to import direct. Notwithstanding the impracticability of the tin-plate consumer buying abroad, it may be of interest to describe, in a general way, the method of figuring the cost of plates laid down, in New York for instance. A rough rule for the purpose is to figure the shilling at 25 cents, which is a little in excess of its actual value, the difference (2 to 3 per cent.) covering the foreign charges. Having thus reduced the English quotation in shillings and pence to American currency, the freight, insurance and duty are then added and the sum will be the approximate cost of the plates delivered here. Or, to be more exact, take the quotation f.o.b. Liverpool, deduct 4 per cent. for cash, then reduce this net price to currency according to the quotation for sight exchange. To this

Liverpool, the cost would be 6500/ or £325. With sight exchange at \$4.88, this would amount to \$1586. Deducting 4 per cent. for cash, we find the net price to be \$1522.56. Though the term f.o.b. should mean delivered on the ship without charge, in reality plates so quoted are too often only f.a.s. (free at ship), and it is not unfair in an example of this kind to allow 1/3 or, say, 30 cents per ton for cartage and handling. In the case considered, this would be \$8.10, and adding also the town dues of 9d. or 18 cents per ton, amounting to \$4.86, we get the sum of \$1535.52. The consular invoice, the charge for which varies somewhat at different ports, must next be taken into account. It should be borne in mind that the consular charge at any given port is the same, whatever the value of the invoice, and while it will be relatively a small item on a large importation the percentage will increase with the lessening value of the invoice. Assuming it to be 14/, or \$3.50, the cost of the 500 boxes of plates on board ship at Liverpool will be \$1539.02. The importer may insure his plates against either partial or total loss, and as there is more chance of the plates being damaged on the voyage than totally lost, it goes without saying that the insurance rates against partial loss are the greater. Present rates are from ½ to ¼ of 1 per cent. to insure against total loss, and ¼ to ¼ of 1 per cent. to insure against partial loss. We believe it is common practice, however, to insure only against total loss, so taking the rate at ¼ of

Influence of Aluminium on Cast Iron.*

BY W. J. KEEP, C. E.; PROF. C. F. MABERY, S. D., AND L. D. VORCE.

Aluminium is a metal obtained from its oxide, alumina. It is white in color and very tenacious, and it alloys readily with iron. Cast iron, ordinarily used, is iron which contains all the carbon that it could absorb during its reduction in the blast furnace. This carbon, when found in chemical union with the iron, is called "combined carbon." In this state it cannot be seen. It is also found mechanically mixed with the iron in the form of graphitic carbon, when it becomes visible. Other elements commonly found in cast iron are phosphorus, sulphur, manganese and silicon. The natural condition of carbon in iron is the combined state. The presence of silicon drives a portion of the carbon into the graphitic state. Sulphur, manganese and phosphorus do not cause the carbon to leave its natural combined state, and if silicon be present these elements either drive it out or overpower it. Carbon is, therefore, a passive element, and is made to change its form by the presence of other elements. It is this change of carbon which indicates, to the eye, the influence of any element upon the cast iron. Iron and combined carbon, or carburized iron, is called "white iron," and the grain is generally very fine, and often even, and the metal is very hard. Graphite darkens the fracture until it becomes a very dark gray, and the grain is coarse and irregular. With increase of graphite the metal becomes soft. We shall confine ourselves in this paper to the influence of aluminium upon cast iron.

Let us for a moment review the present knowledge on this subject. It is known that fused wrought iron, or a mixture of cast iron and steel or steel alone, either of which would make castings which would be full of blow-holes, will make solid and homogeneous castings if as small a quantity of aluminium as one-tenth of 1 per cent. is added just before pouring. Also that such addition causes the iron to remain fluid long enough to allow its being cast into molds. It seems to be the general opinion that the aluminium does not remain in the metal, but that it exerts its influence between the time of its introduction and the time of its departure. This seems to be the sum total of the present information regarding the influence of aluminium upon iron.

We propose in this paper to give the results of a series of very carefully conducted tests, to further substantiate the statements just made, and to settle the question as to whether aluminium remains in the casting. Also to determine the influence of this metal upon the physical structure and upon the composition of iron. The physical tests that we have employed are what are known as "Keep's tests," and by them we are enabled to make apparent to the eye the influence of any element upon cast iron. When it was understood that we were to undertake this examination, the Cowles Electric Smelting and Aluminium Company, of Cleveland, kindly furnished us with what ferro-aluminium we needed, and Prof. C. F. Mabery and L. D. Vorce, of the Case School of Applied Science, of Cleveland, volunteered to undertake the chemical examination of the test bars. The results of these investigations will be appreciated when it is understood that we began without the expectation of the very important results we have obtained, and that the methods for the determination of minute quantities of aluminium were so imperfect

that the small quantities used in the "Mitis" process could not be determined if they still remained in the castings.

Regarding the physical tests, we should state that we use two bases—one a white iron, with composition, Si., 0.186, P., 0.263, S., 0.0307, Mn., 0.092; the other a gray Swedish iron marked "FL M." with composition Si., 1.249, P., 0.084, S., 0.04, Mn., 0.187. The ferro-aluminium contained Si., 3.86 and Al. 11.42 per cent. The melting was done in a covered plumbago crucible, in a coke furnace driven by a blast of 2½ ounces. The test bars were 1 foot long, and cast in pairs; one ½ inch square, and its mate ⅞ inch thick and 1 inch wide.

We started with 30 pounds of the base in the crucible; at the first heat there were cast four pair of bars from the base alone, which took 5 pounds of metal. After allowing the remaining metal to become solid, we returned the runners of the first cast, and added 4 pounds of the base, and returned the crucible to the furnace. When nearly melted, we added enough ferro-aluminium to bring the percentage of aluminium in the whole to where we wished it, for the second set of bars. We proceeded in like manner through the entire series of heats. To arrive at the influence of the aluminium, we made another series of heats, with the same base, with exactly the same conditions, only we did not add the aluminium. The difference between the two series of tests gives the effect of the aluminium.

We shall consider this subject under the following heads:

The solidity of castings and the prevention of blow-holes.

Does the aluminium remain in the iron to exert an influence when the iron is remelted?

The effect of aluminium upon the grain or the changing of the carbon from the combined to the graphitic state.

The taking away the tendency to chill.

The prevention of sand scale.

The effect upon hardness.

The resistance to a load gradually applied or a dead weight.

The resistance to a load suddenly applied or impact.

The elasticity.

Permanent set.

The effect on the shrinkage of the iron.

The fluidity of the melted metal.

1. *The Solidity of Castings and the Prevention of Blow-Holes.*—All of our tests bear upon this subject, but we have made one test, using the white base iron, and one-tenth of 1 per cent. of aluminium. It is also impossible to get a solid casting of the white base alone, and its resistance to weight is generally about 175 pounds for the ½-inch square bars, and its resistance to impact is about 100 pounds. We have obtained, however, exceptionally sound castings of this base, and we shall use the strength of such castings for comparison. These sound castings of the white base alone resisted a weight of 379 pounds. With one-tenth of 1 per cent. of aluminium added, it resisted 545 pounds, a gain of 166 pounds, or about 44 per cent., from this small addition. Measuring the resistance to impact the white alone was 239 pounds; with aluminium, 254 pounds, or about 6 per cent. gain. The castings appear of slightly finer grain, and the character of the crystallization is somewhat different, but the secret of the strength lies in the closing of the spaces between the grains—or, in other words, in the increased solidity of the casting. No other change is noticeable in the metal. A graphic representation of this test is not needed.

2. *Does the Aluminium Remain in the Iron to Exert an Influence When the Iron is Remelted?*—To determine this we made a series of six heats from the white base, and added to the first heat one-fourth of 1 per cent. of aluminium. This amount alters the grain very perceptibly, making it whiter and finer, and removing the tendency of

the base to a slight specular appearance, and giving a homogenous fracture. It increases the strength above the base about 20 per cent. to resist weight, and for impact an increase of over 70 per cent. The next heat was a remelt of the first, with the runners of the first cast put back, and enough white base added to reduce the aluminium to two-tenths of 1 per cent. when the second cast was made. Our comparisons will now be made between this series and the comparison series of the base alone. Looking at the chart, Fig. 1, we see that

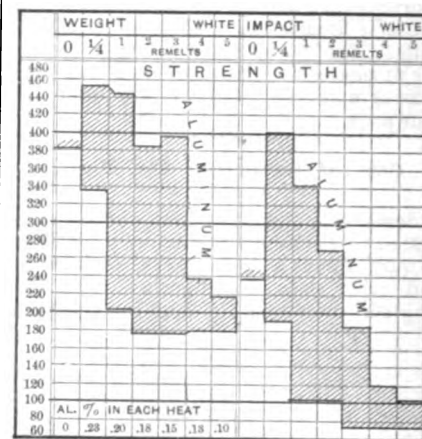


Fig. 1.

the effect of the aluminium in this second heat is greater than it was in the first case to which heat the aluminium was added. This is due to the increasing porosity at each heat of the base when melted alone, and to the solidity of the series with aluminium. At the third and subsequent heats the same result is apparent, the remaining aluminium causing more solid castings, though the continued additions of white iron at each heat, and the consequent lessening of aluminium, render the castings less strong at each remelting. Yet the effect of the aluminium is so constantly apparent at each melt as to leave no doubt as to the presence even in the sixth remelting. The chart, Fig. 1, which we have prepared, shows these effects, both as to weight and impact.

As we proceed with the description of other tests, it will be noticed that we add but a small quantity of aluminium at each heat, and depend upon the additions made at previous heats to bring up the required percentage. The results of the tests show conclusively that the aluminium remains and exerts its influence in subsequent casts as fully as would be expected.

3. *The Effect of the Aluminium upon the Grain, or the Changing of Carbon from the Combined to the Graphitic State.*—Let us say a few words in regard to the way in which, and the reason why, carbon takes on the graphitic form. All of the carbon, both combined and graphitic, which the iron is capable of holding when solid must be dissolved and exist as combined carbon in the melted iron. Cast iron made in the usual way contains all of the carbon that it can hold. Very often cast iron, when melted, contains more carbon than it can hold in combination when at a lower temperature; if so, as the iron cools down such excess of carbon will separate and rise to the surface. In any case, when a melted iron contains more carbon than the iron can hold in combination when cold, all of the excess will not be able to reach the surface, though it may not be visible in the casting to the eye. The introduction of other elements into the melted metal may alter its ability to hold the carbon. Sulphur causes it to let some go, while manganese enables it to hold more carbon in solution. Silicon also somewhat diminishes the capacity of the molten

* Read by W. J. Keep, at the Cleveland Meeting of the American Association for the Advancement of Science, August 17, 1888.

metal to retain carbon while it is in liquid. Aluminium allows most of the carbon to retain its natural combined form until the metal is too thick for the separated carbon to escape, but at the instant of solidifying aluminium causes the iron to drop a portion of its carbon from the combined state. This liberated carbon takes the graphitic form, and is imprisoned in the otherwise solid iron.

The advantages arising from a change of carbon from the combined to the graphitic state, at the instant of crystallization, are that all of the carbon thus liberated is imprisoned uniformly throughout the casting, and is not accumulated in pockets, forming soft and hollow spots, as would be the case if liberated while the casting was yet fluid. Aluminium more than any known element accomplishes this. It not only changes white iron to gray, but seems at once to change the whole character of the metal. The drop of carbon seems to be instantaneous at the instant of crystallization, and for this reason the time taken in cooling has little effect. In fact, when the aluminium obtains full control of the carbon it would seem that the more sudden the cooling the more the formation of the graphite, and the thin portions of the graphite are therefore as gray as the thicker portions. The powerful and positive influence of aluminium upon the carbon, and therefore upon the grain and color of the iron, is shown by an examination of the series of samples that we present, here to-day.

Take those made from the white iron base, with almost no silicon present; the

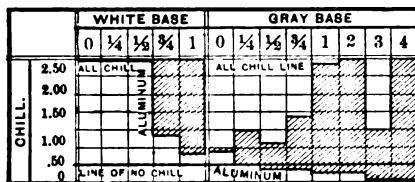


Fig. 2.

base alone gives a white bar full of blow-holes. An addition of one-fourth of 1 per cent. aluminium gives us not only a perfectly homogeneous and solid casting, but the color is darker, and the grain shows that some of the carbon has taken the graphitic form. The thin casting shows this even more than the heavier bar, showing that the change occurred suddenly and that time had but little effect. Examining each bar in turn, we see that each similar addition of aluminium produces a corresponding effect until, at the third addition, or with three-fourth of 1 per cent., the casting is gray, with no sign of white, either in the square or in the thin bar.

The set of tests with the gray iron base, containing $1\frac{1}{4}$ per cent. of silicon, shows that silicon and aluminium work together in the same direction, and that a slight addition of aluminium takes the white out of the casting at once, giving the same grain in a thin as in a thick casting. This effect increases as the aluminium increases, and the indications are that at least up to 4 per cent., the limit of our experiments, the more the aluminium, the softer and grayer the castings.

4. The Taking Away the Tendency to Chill.—If cast iron be cooled very suddenly, the carbon, which the melted metal holds in combination, will not have time to separate, and will be retained in the combined state. Such castings are called chilled castings. Chill is caused by molten iron running against a body which rapidly withdraws its heat, causing it to retain its carbon in the combined form. Back from the chill, where this instantaneous cooling could not exert its full effect, a portion of the carbon takes the graphitic form. This property is made use of when it is desir-

able to obtain hard wearing surfaces, and, in the same casting, tough and soft central portions, as in car wheels. While this chilling effect is exceedingly valuable for many purposes, yet, generally speaking, the founder desires exactly the reverse.

We have said that aluminium causes the carbon to assume the graphitic form on

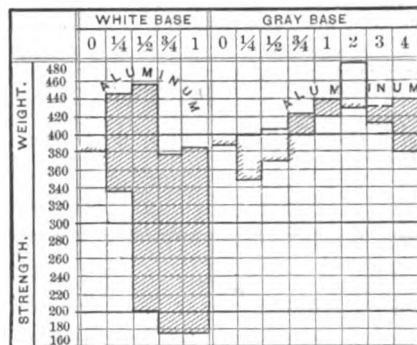


Fig. 3.

instant of solidifying, and therefore the sudden abstraction of heat does not imprison the combined carbon and cause chill. This effect of aluminium is to give a uniform grain for thick and thin castings, and not allow the coldness of the mold to affect the grain. Fig. 2 gives graphically the results of experiments made.

5. The Thickness of Sand Scale.—This is an important consideration, for the sand must be cleaned from the casting, and the surface must first be cut before the interior can be reached. To prevent the iron from burning the sand into itself and thus forming a scale, a plumbago facing is sifted on the surface of the mold, but it is difficult for the facing to lie on the surfaces or to resist the intense heat of the metal. When aluminium in an iron causes the dropping of the graphite from the mass of the metal, that graphite which is on the surface of the casting separates and forms a perfect plumbago facing, which opposes the sand and the heat. It will, therefore, be seen that in castings having sufficient aluminium to cause this separation of graphite, there will be no sand clinging to the face, and that the surface will be as soft as the interior of the casting. Every ironworker will appreciate this good effect of aluminium.

6. The Effect upon Hardness.—Hardness in cast iron is caused by the carburized or white iron in masses large

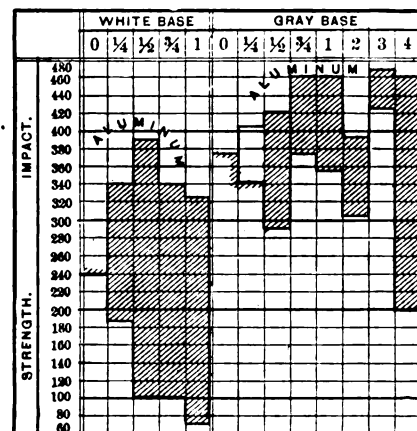


Fig. 4.

enough to oppose the tool. If the carburized iron exists in minute threads stretched around atoms of graphite, a tool will easily cut it and it will not be considered hard. This graphitic carbon, minutely dividing the mass, gives the tools of the workman a chance to cut or break the films of metal, giving what we call

softness to the iron. The later the carbon is dropped the smaller will be the atoms of graphite and the closer the grain. Yet this greater subdivision will, for the reason just given, make the iron work more easily. The fineness of the grain of iron affected by aluminium causes such iron to be much more easily cut than iron of coarser grain. The next question to consider is that of strength. The power of wrought iron and steel to resist extension is so great that where such stresses are to be resisted decarbonized metal should be used. The resistance of any cast iron to crushing is so great that we need not consider this. The forces which cast iron should be made to resist, aside from crushing, are a dead weight, or a blow applied transversely. We should, therefore, test cast iron with these forces.

7. The Resistance to a Load Gradually Applied, or a Dead Weight.—If we compare the transverse breaking weights of the two series which we have been considering, number by number, we perceive that the aluminium has increased the strength to sustain a constant load. This is a very important effect, and perhaps comes partially from the tenacity and strength of

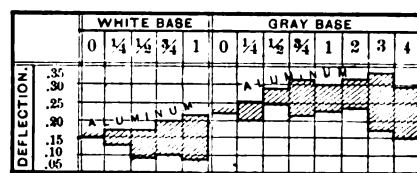


Fig. 5.

aluminium itself, but probably more from the uniform grain of the iron. Fig. 8 is a record of the tests.

8. The Resistance to a Load Suddenly Applied, or Impact.—It may be thought that the effect is substantially the same, whether the force be a constant weight or a suddenly applied blow. We shall at a future time prove that the effects are not the same, and that an iron should be tested by a blow if it is expected to resist impact. By a comparison of the graphic representation, Fig. 4, we see that the capacity to resist impact is increased by the addition of aluminium much more than the capacity to resist a dead weight. It will be seen at a glance that the test bars made with the white base are benefited far more than those made with the gray base. The reason for this is, that the white base alone made porous castings; at each remelt this porosity increased, due to the continuation of the heat, running the strength down to 68 pounds at the fifth heat. The first, and each subsequent addition of aluminium, caused the castings to be perfectly sound, and the infinitesimal atoms of graphite deposited throughout the metal removed the rigidity and brittleness of the initial metal. The gray iron base contained enough silicon to accomplish all this, and the only effect on strength that the action of the aluminium on carbon could have would be to increase the fineness of the grain, unless the toughness of the aluminium itself could give strength to the casting, though the aluminium no doubt removed any slight blow-holes that existed in the initial gray metal. This leads us to notice that each addition of aluminium increases the strength over that of the initial metal. We must expect that after we have added enough aluminium to cause a solid casting, and to remove the brittleness that the dividing up of the mass by the atoms of graphite accomplishes, any further additions of aluminium, and consequent increase of graphite, which has no strength of itself, must weaken the casting.

9. The Elasticity.—The compactness and closeness of the grain of cast iron when aluminium was the agent by which the

graphite was precipitated and the fine attenuation of the veins of carburated iron cause the metal to be very elastic, and, as we have seen, not so brittle as without aluminium. Fig. 5 illustrates this.

10. *Permanent Set.*—This is caused by the compression of the graphite within the framework of carburated iron. When this compression of graphitic carbon is produced by transverse bending the framework of the metal also takes on a permanent form, which cannot be altered except by a greater force than was before applied. The fineness and compactness of iron alloyed with aluminium gives less permanent set than iron equally as soft when such softness is produced by silicon.

11. *The Effect on the Shrinkage of the Iron.*—The more suddenly and completely the carbon is changed from combined to graphitic, at the instant of crystallization, the more space will the casting occupy. When the casting is cold it will therefore have contracted less than if more carbon had remained combined. White iron, having most of its carbon in the combined state, shrinks from $\frac{1}{4}$ to $\frac{1}{2}$ inch in each foot. Gray iron sometimes shrinks as little

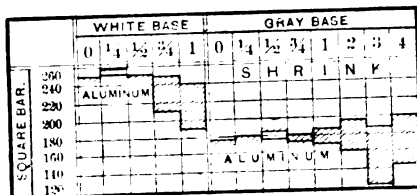


Fig. 6.

as $\frac{1}{10}$ inch to each linear foot. As the combined is the natural state for the carbon, we may say that this maximum shrinkage is the natural shrinkage for cast iron having its carbon combined. We can therefore say that aluminium takes out or reduces shrinkage when a sufficient quantity is added. This is a very great advantage, as shrinkage requires great skill in the preparation of patterns to prevent warping and cracking, and violent internal strains within the castings. The lessening of shrinkage avoids these evils, and is therefore a great gain. Fig. 6, the shrinkage chart, furnishes the most conclusive proof of our explanation of the way in which shrinkage is lessened. With both the white and the gray bases, during the first two additions, the shrinkage of the square bar is slightly increased. The influence of the aluminium thus far has been in the direction of elimination of blow-holes, and causing an even distribution of the dark and light grains. At the third addition, however, when the amount reached three-quarters of 1 per cent., the effect was appreciably felt upon the carbon, as seen by the color, and as we should expect, from the deposition of this large bulk of graphite; the casting does not shrink as much, and each addition of aluminium increasing this bulk of graphite decreases the shrinkage. The effect upon the grain and color of the thin bars of the series is very remarkable, showing that the aluminium has changed enough carbon to graphite to produce a dark even grained casting. The effect upon the shrinkage of these thin bars (see Fig. 7); is as we should expect, and is more marked even than in the square bars. The shrinkage in the thin bars of the white series shows a constant decrease as the aluminium increases, but in the series for comparison, the shrinkage dropped still more rapidly. If a new crucible was used in commencing this comparison series, enough silicon might have been absorbed to produce this effect. This leads us to remark that on account of the variations of conditions in any series of tests, that cannot be foreseen, we must avoid drawing any but general

conclusions, and these should be based upon a large number of experiments.

12. *The Fluidity of the Melted Metal.*—Our tests of fluidity (see Fig. 8) are correct as far as each individual heat is concerned, but variation may be due to the heat of the metal of that particular cast when poured. Viewed in a general way, the indications are that with the white base, with almost no silicon, the aluminium has increased the fluidity; but judging

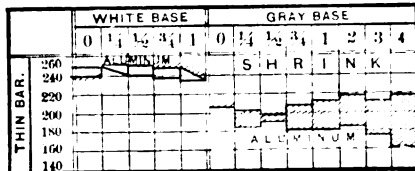


Fig. 7.

from the series with the gray base, we would say that, combined with silicon, aluminium reduced the fluidity. Our remarks in connection with shrinkage show that a sharp casting is produced by the instantaneous dropping of graphite when crystallization takes place, and that if the iron is fluid enough to fill the mold, any extra fluidity causes the iron in shrinking to draw away from the mold. Again, the percentage of aluminium necessary to bring about these desirable results will be too small to have much effect upon the fluidity of the metal. The fact of the iron giving sharper and more perfect castings on account of the swell of the casting, caused by the deposition of graphite at the instant of solidification might cause the iron to be pronounced more fluid, if judged by the appearance of the castings. No doubt the presence of varying quantities of manganese, sulphur, phosphorus and silicon in the cast iron used would modify the influence of aluminium, and until this is understood it may require considerable experiment to determine the amount of aluminium required or how it shall be introduced.

This hurried presentation of the remarkable effects of aluminium upon cast iron will give an idea of the great benefit which is now promised to the iron founder by the rapidly falling price of aluminium as cheapened by the electric furnace. Following the publication of this part of the subject we shall soon present the results

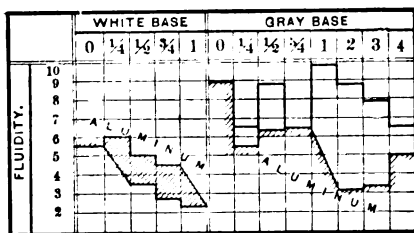


Fig. 8.

of the laboratory work of Prof. Mabery and Mr. Vorce, which will throw still more light upon this interesting subject.

We find in an article from an unknown source the following values for the traction coefficient on different roads under ordinary average conditions: "Railroads in good condition, the axles well lubricated, 4 pounds per ton of load; upon railroads under ordinary, but not very good, condition, 8; upon a very smooth pavement, 12; on ordinary street pavements in good condition, 20; on street pavements and turnpikes, 30; on turnpikes new laid with coarse gravel and broken stone, 50; on common roads in bad condition, 150; on entirely loose ground or sand, 560."

The Perils of Steam Navigation.

Another ocean horror emphasizes the fact already established that our best built steamships have a vulnerable part which all the devices yet contrived fail to remedy. The Danish steamer Geiser, from New for Copenhagen, with 149 souls on board, while near Sable Island on the 14th inst., was struck on the starboard side amidships with terrific force by the steamer Thingvalla, of the same line. The blow was received between the coal bunkers and the engine-room. In about five minutes the ill-starred ship, which had been cut nearly in twain, was engulfed in the sea, taking down 118 persons, only 14 of the passengers and 17 of the crew surviving. The Thingvalla's bows were carried away completely as far back as the collision bulkhead, which yielded perceptibly to the tremendous pressure of the sea, but no time was lost in rendering it more secure, thus saving the ship from the fate of her consort. The Cunard steamer Oregon, it will be remembered, speedily went to the bottom, although struck only by a collier. It is always so when the engine compartment fills with water, on account of the disproportion of the flooded space as related to other divisions of the ship. Vessels built on the cellular plan of construction have been pronounced "unsinkable," but it remains to be demonstrated that they are really so when subjected to the severest test.

The loss of the Geiser will be the subject of official investigation before the Danish Admiralty Court. The material facts, however, are obvious to the ordinary reader of the news, and the conclusion seems inevitable, as expressed by high authority on the New York Maritime Exchange, that when the critical moment came, and collision seemed imminent, "either of the officers in command lost his head, or his orders were misunderstood at the helm." So long as speed is the ruling ambition and the chief reliance for commercial success in Atlantic Steam Navigation, any proposition to protect the engine compartment by means of heavy plating would be promptly rejected, since it would neutralize this indispensable quality by adding tonnage which would be superfluous except in extreme emergencies such as might never occur. Moreover, it is hardly supposable that any device of this character would endure the impact of a laden steamer like the Thingvalla, even if engines were "slowed down." Ocean travelers of to-day deliberately elect to take the fastest steamer, assuming the chances of collision or any other possible form of disaster. And this they are encouraged to do by the small ratio of fatalities on the ocean highway compared with those which overtake travelers by rail or other modes of conveyance.

The lamentable fate of the Geiser seems to enforce at least one obvious truth—namely, that safety at sea depends on skillful navigation, the vigilant use of signals and the sounding lead, rather than on further improved mechanical appliances of any kind whatever. The resources of human ingenuity in this direction seem to be well-nigh exhausted. The subject of "ocean steam losses," however, has hardly received the attention which the safety of travelers demands. The strict observance of certain limits in defining the course of steamers on their outward and homeward trips respectively would do much to lessen the perils of ocean travel.

A Mexican letter says, there is much more attention given to agriculture in that country, and that large importations of American agricultural machinery are being made, as it is found that the Americans make lighter and stronger machinery than the English.

MANUFACTURE OF ALUMINIUM.**THE CASTNER PROCESS IN OPERATION.**

The English technical newspapers contain accounts of a visit made lately by a party of scientists to the new works of the Aluminium Company, Limited, at Oldham, where new works have been built for the production of aluminium by the process of H. Y. Castner, a New York chemist. The works are in close proximity to the Oldbury Station of the Great Western Railway, and contiguous to Messrs. Chance Brothers' alkali works, from which an important part of the raw materials employed in the manufacture—namely, caustic soda and hydrochloric acid, are derived. The processes included in the manufacture are the production of sodium by Castner's method, of the double chloride of sodium and aluminium, and the reduction of aluminium from the latter salt by the action of sodium. The first of these, which is in many ways the most interesting of the different operations, is effected by the action of a very intimate mixture of carbon and iron obtained by coking a mixture of pitch and finely divided iron upon melted caustic soda at a strong red heat. The operation is performed in large cast-steel crucibles, attached to the head of a hydraulic plunger, which are pressed against a fixed arc and delivery pipe, the whole arrangement forming a kind of still which is heated by gas from a Wilson producer running with heated air. The active reducing agent is carbon, the purpose of the iron being merely to ballast the carbon and prevent it floating to the surface of the molten alkali. About one-third of the latter is reduced, and distils over into a tubular receiver connected with a cylindrical pot filled with naphtha, which receives the condensed melted sodium. The remainder of the alkali becomes carbonized, and the receivers, when cooled, are lixiviated in a tank, giving a solution of carbonate of soda, which is pumped back to the alkali works to be reconverted into caustic.

The pots now used are about 18 inches in diameter, 2 feet high, and contain about 80 pounds of materials. When the distillation is completed the pot is removed from its seat, drawn by a pair of tongs on a bogie to the discharging pit and emptied, a fresh charge being added without allowing it to cool. In this way, and by subjecting the materials to a preliminary heating before charging, the time of one operation has been reduced from two and a half to one and a half hours. A maximum quantity of 14 pounds of sodium may be obtained by one operation, and the capacity of the four furnaces, each having five reducing pots, is about 1500 pounds of sodium per day. The sodium when collected is melted in heated petroleum, and cast into rectangular bars about a foot long, a form which is convenient for packing in petroleum tins. When required for export the tin filled with petroleum and sealed is placed within a new tin partly filled with lime and petroleum, which apparently protects the metal in the inner tin from oxidation. The next operation, the preparation of aluminium chloride, is performed by the slow action of gaseous chlorine upon a mixture of alumina and carbon placed in a retort and strongly heated. The alumina obtained, as nearly pure as possible, is thoroughly incorporated with the carbon in the form of lamp-black by drying and molding the mixture in a small drain-pipe machine. The chloridizing furnaces resemble small open-hearth regenerative steel furnaces, each one having five D-shape clay retorts on the bed which are charged from one end and are connected with a condenser at the other, the charging side being also provided with a chlorine feed tube. The

chlorine is made in stone stills in the usual manner from manganese ore and hydrochloric acid, the latter being laid on by a main from Messrs. Chance's works. Originally the gas was delivered directly from the stills to the retorts, but owing to an explosion from some irregularity in the working of the latter it is now stored in gasometers, and the supply to each retort is controlled by a delicate hydraulic regulator, which can be adjusted by simply turning a cock to deliver the gas in quantities varying from about 50 pounds to 300 pounds in 24 hours.

The charge of the retort requires from two to three days to work it off, and the working capacity of the 12 furnaces is about 6000 pounds per day. The mixed double chloride of sodium and aluminium, containing about 12 per cent. of the latter metal, is finally reduced by heating it with sodium and cryolite, 80 pounds of the double chloride, 26 pounds of sodium, and 30 pounds of cryolite, ground to a fine powder, giving 8 pounds of metallic aluminium, which contains about 98 per cent. of the pure metal, the rest being mainly iron and silicon. The reducing plant is still to some extent in the experimental stage; a small reverberatory furnace with a bed made of alumina and fire-clay having been tried in conjunction with two forms of crucible furnaces, the latter being so arranged that the melted metal as it forms may fall through a hole in the bottom into a collecting pot placed below. No one of these forms of apparatus has yet been decisively adopted; but the experiment seems to show that some form of crucible furnace working continually is likely to be most advantageous. When fully at work, the producing capacity for aluminium will be about 500 pounds daily, at about 15/ per pound, and 9d. per pound for sodium. The company, in addition to the pure metal, produces all the varieties of copper alloys known as aluminium bronzes, with from 2½ to 10 per cent. of aluminium, and a 15 per cent. alloy with iron for a base in the production of soft iron castings.

Iowa Shippers Up in Arms.

A meeting of jobbers and manufacturers of Iowa cities was held at Davenport, Iowa, on the 14th inst., for the purpose of sustaining the Iowa Commissioners in the railroad rates they have proclaimed, and obtaining relief from alleged discriminations made by the roads against the shippers of the State. Representatives to the number of more than 100 were present from Davenport, Dubuque, Clinton, Muscatine, Burlington, Ottumwa, Des Moines and Keokuk. W. H. Torbert, of Dubuque, was chosen chairman. He said the great interests of the State were struggling for the right to live. There is no disposition, he affirmed, to ruin the railroads, but firmness would be insisted on.

Governor Larrabee was introduced and received with applause. The Governor presented his well-known views at some length, and gave his experience as a manufacturer and shipper, he being the owner of a large flouring mill. He said the business men had assembled "to protest against the wrongs that are inflicted by the railroads upon the jobbers, manufacturers and farmers of Iowa, and to formulate plans for united action. Railroad managers, by denying that abuses exist, seek to impeach the testimony of three-fourths of the people." The Governor reviewed the history of railroad legislation.

Fred. Wild, an old railroad manager, now engaged as secretary of the local shippers' association, gave tariff statistics and percentage comparisons from many points to others inside and outside of the State, showing how business is oppressed by existing schedule rates. The Hon. Jones T.

Lane gave a legal view of the case. Mr. Lane is the counsel of the railroad commissioners. He says the railroads have not raised a single point they will dare carry to the Supreme Court of the United States. Their hue and cry was but a conspiracy to throw dust in the eyes of the people of Iowa.

Robert Donahue, of Burlington, also addressed the meeting. A committee on organization was formed, composed of Fred. Wild, of Davenport; Robert Donahue, of Burlington; W. Lange, of Dubuque, and J. R. Baldwin, of Clinton. An evening session was held, but it was of a strictly private character. The reported object was the formulation of plans for a legal contest.

Corporation Wrecking.

Railroad wreckers were roughly handled in a decision rendered in Chicago last week by Judge Tuley in the case of the Smith Bridge Company vs. Henry Crawford. The plaintiffs claimed that in 1882 they constructed two bridges over the Wabash River for the Chicago and Great Southern Railroad, under contract, for \$21,000; that Mr. Crawford, who undertook to build the road, did so under a construction contract, having claimed that he had no interest in the company, whereas, in fact, he owned \$2,400,000 of the stock. It was further claimed that this construction contract was made through a dummy board of directors, the contract being made to himself; that as soon as the contract was completed he caused a mortgage he held on the railroad to be foreclosed and a receiver for the entire assets appointed. The old company being thus burst up, a new company was created. In this way every creditor of the old company, including the complainants in the present suit, were left without any means of satisfying their claims. "The time has come," said the Judge, "when the courts must rise equal to the emergency that is now upon them, equal to the changed conditions and methods of transacting the affairs of corporations, and hold that the manipulators of corporations do not lose their identity because they hide behind corporate forms and proceedings. Trusts, heretofore unknown to the law, are formed to manipulate corporations, by which the people are oppressed and the powers of the State defied. Corporation wrecking has become an established practice, and parties even use the forms of a court of equity for that purpose. Advanced ground must be taken, and these manipulators of corporations, whether 'trustees' or 'wreckers,' must be held personally accountable for corporate assets which get into their possession and for all profits made by their manipulations in their private interests of corporate property or corporate franchises. The courts must in such cases apply the rule which courts of equity apply in all other transactions and deal with the real party, the moving party, the real actor, and will grasp the substance without regard to the obscuring forms under which it may be hidden."

At the last meeting of the Quebrada Railway, Land and Copper Company, the concern operating copper mines in Venezuela, the chairman stated that under their contract with the Société des Métaux the company are guaranteed £70 per ton of best selected, the production being limited to 12,960 tons of copper, as its equivalent, for three years. During the course of his remarks the chairman said: "The producers of copper may find it wiser to limit their production of copper in the future to such quantities as they can sell at a reasonable profit than to go on producing larger quantities at a loss and exhausting their mines into the bargain."

English Capital at Cumberland Gap.

The American Association, Limited, with headquarters at Knoxville, Tenn., is an English syndicate, composed of the following directors: E. A. Pontifex, president, who is also president of the Cape Copper Mining Company, of London; Dilwin Parrish, who is also president of the London Telephone Company; Thomas Brooks, of Manchester, coal master and banker; Thomas Ashton, banker and manufacturer; N. Story Maskeylyne, M. P. and, Jacob Higson, of the Ebbwvale Steel Company. Mr. Higson, who has other large interests in England, is a man of great experience, and has directed a great deal of foreign money to this country. Clarence Carg, of New York, is another director. Several large stockholders are heavy coal operators in Great Britain. The general manager of the company is Mr. Alex A. Arthur, at Knoxville, Tenn. The syndicate owns Cumberland Gap and 60,000 acres of mineral lands adjoining, lying in the States of Kentucky, Virginia and Tennessee. These three States corner in on the top of the Gap. This region of country has for a long time been known to be underlaid with deposits of iron ore and coal, but being inaccessible to markets the lands were of little value. Recent geological surveys and publications by the State of Kentucky caused foreign capitalists to make investigations, which has resulted in large investments in Eastern Kentucky coal fields. The company is now tunneling Cumberland Gap, and will open it to all railroads. The Louisville and Nashville Railroad is now building an extension from Pineville, and will connect with a new road from Atlanta. Two other roads are approaching this point to make connection, and five additional lines are negotiating for the right to run through the tunnel. Claims to have Oriskany ore running 58 per cent. metallic iron with only trace of phosphorus; red fossiliferous ore in abundance, with 58 per cent. iron; a carbonate iron, with 44 per cent. of iron and low in phosphorus; argillaceous ore, with 47 per cent. of iron and manganiferous ore, running 30 per cent. manganese and 10 per cent. iron. Besides, the Company own Bessemer ore lands in the Allegheny range. It is claimed that an abundance of fine lime rock lies easy of access. The coal deposits are perhaps more bountiful than the ore. Near the Gap there are from 8 to 14 seams, all within reach, among them three beds of Cannel and three beds of coking coal. These coals have been thoroughly tested both in this country and across the water. The Cannel coal of Eastern Kentucky has long been highly valued for gas producing as well as for fuel. Mr. Arthur claims that they will be able to produce steel very cheaply. The company have selected a level valley in which to locate a town, and will call it Middlesboro', after the great manufacturing center of England by that name. Several coal leases have already been let out by the company, and they are now arranging for the first of their furnaces to be put up at once. Including the men at work on the approaching extensions of the railroad, another at work opening up the mines, there are over 5000 laborers in the vicinity, pushing forward this large enterprise.

The Pittsburgh Suspension Bridge.

—The Sixth Street suspension bridge across the Ohio River connecting the cities of Pittsburgh and Allegheny is now being inspected in a very thorough and exhaustive manner. The bridge was built in 1856 by John A. Roebling, and was the second of the kind in the country, the first having just been completed at Niagara. The present inspection is under the direction of John A. Roebling, Jr., of New York, and Engineer W. Hilderbrand is in charge of

the work. The anchorage of the bridge, by its cables, was considered wonderful when it was built. Eight long links of chain go down into the ground in semicircular form at the ends of the bridge, and to these the cables are attached. At the end of each of the four chains is a heavy cast-iron plate weighing five tons, which is imbedded near the bottom of a mass of solid masonry 35 feet long and 25 feet deep. This masonry has been opened for examination and is in first-class condition. The cables and chains, which were surrounded with tar, have not corroded, but paraffine is being substituted for the tar, and the rest of the wall filled up with big cut stones cemented together. The caps have also been taken off the towers, and

tained by electrolytic methods. It is noted that the iron mirror rotates the plane of polarization, the direction of which varies with the direction of the electric current.

New Single-Action Arch Press.

We present in the accompanying engravings a general view and details of one of the latest designs of single-action presses put upon the market by the E. W. Bliss Company, of Brooklyn, N. Y. It is specially adapted for operating sub-presses in the manufacture of watch movements and other small work requiring considerable power and great accuracy. It may also be used in ordinary cutting, punching

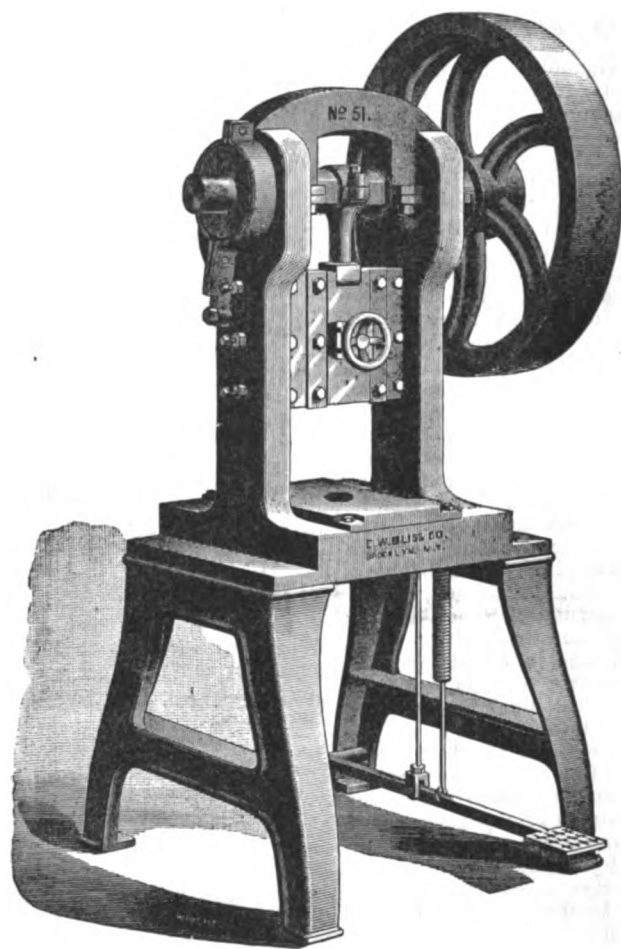


Fig. 1.—General View.

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all the wires of the cables are being carefully inspected by Mr. Hilderbrand. There is not the slightest break in those so far inspected. The bridge and its anchorage are practically in as good condition as when it was built.

A transparent deposit of platinum can be obtained by covering the bottom of a glass dish with a mixture of platinum chloride and glycerol; this is evaporated to dryness, and finally washed with alcohol to remove the product of decomposition of the glycerol. The metallic deposit is perfectly transparent, the transmitted light being of a dark blue-grey tint. The commercial method of producing platinum mirrors by reducing the chloride with essence of lavender and heating the containing vessel up to the temperature at which the glass softens does not yield a sufficient cohesive product. Transparent layers of platinum and mirror deposits of iron, nickel and cobalt, can also be ob-

and forming operations within the range of its capacity. The press frame is of the ordinary arch pattern, and the slide is provided with adjustable V-shaped gibbs to take up wear and keep slide working true. The special feature of the press is in the slide, which is made in two parts and connected with a steel wedge-shaped adjustment, making a practically solid mass of metal between the crankshaft and face of slide, which is especially desirable for heavy or very accurate work.

The details of this wedge adjustment are shown in Figs. 2 and 3. The mandrel is made in two parts, and a wedge, W, is fitted between these, being operated by means of a screw, S, and handwheel and engaging the slides P R. The height of the mandrel from the bed can thus be accurately adjusted. A powerful clutching device is used to connect the wheel to the shaft.

This press is designated as No. 51, and its general dimensions are as follows: Width between uprights, 12½ inches; open-

ing in bed as desired; motion of slide from $\frac{1}{4}$ to 4 inches, according to the work; adjustment of slide, $\frac{1}{8}$ inch; balance wheel, 34 inches diameter, $4\frac{1}{4}$ inches face, weight 400 pounds. Total weight of press, 1400 pounds.

Recent Treasury Decisions.

The Secretary of the Treasury has promulgated the following decisions *in extenso*, affecting the customs duties on metals:

LOCOMOTIVE CRANK-PIN TURNINGS.

On an appeal from an assessment of duty at the rate of $2\frac{1}{4}$ cents per pound on certain iron locomotive crank-pin forgings claimed to be dutiable at the rate of 2 cents per pound for "forgings of iron and steel for vessels, steam engines and locomotives, or parts thereof, weighing each 25 pounds or more," the Department revokes the assessment. The question involved in this case is whether the term "forgings of iron and steel" used in said

Bessemer steel slabs or cakes, which are intended for use in the manufacture of finished steel plates, sheets or bars, is held to be dutiable at the rate of 45 per cent. ad valorem for "steel ingots * * * and slabs, by whatever process made, * * * valued at 4 cents per pound or less."

DUTY ON COPPER IN SILVER ORE.

The Treasury Department affirms a decision of the collector at El Paso, Texas, assessing duty at the rate of $2\frac{1}{4}$ cents per pound on the copper contained in certain so-called silver, and entered free of duty as silver ore. The appellant claims that, inasmuch as the ore contains less than 5 per cent. of copper, and as there are no smelting works in the United States which will pay for copper contained in any ore unless the amount should exceed 5 per cent., the ore in question is strictly a free or silver ore. He further claims that the percentage of copper found—viz., $\frac{1}{8}$ per cent.—in said ore, having been ascertained by the wet or volumetric method, is excessive,

of a large grain elevator at the same time in the same city gives color to the theory that the fires were of incendiary origin. All were covered by insurance.

The Oscillations of High Chimneys.

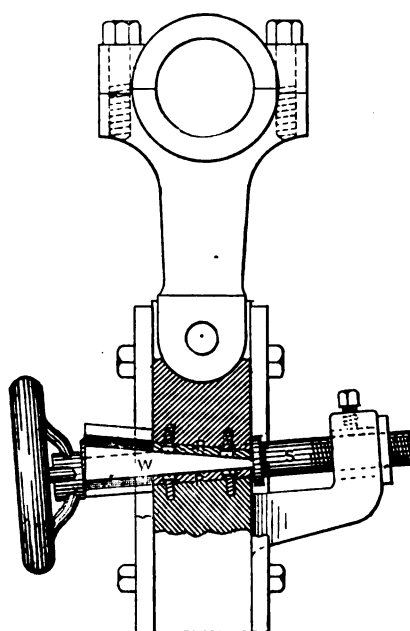
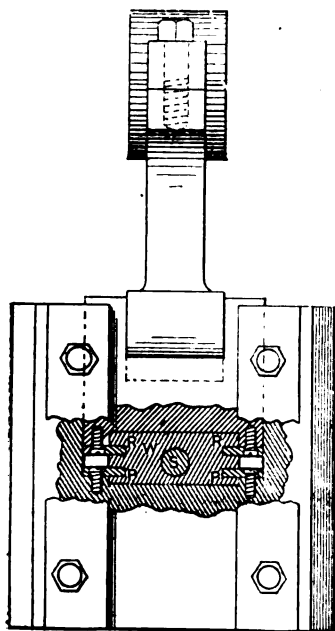
—In the *Mémoires de la Société des Ingénieurs civils* particulars are given of the oscillations of a chimney stack near Marseilles, 25 m. (115 feet) high, with an exterior diameter at the top of 1.22 m. (4 feet). During a severe storm it was determined, by observing the shadow of the chimney, that its greatest oscillation was half a meter (nearly 1 foot 8 inches). It was further observed that a chimney set in motion by a gust of wind oscillates from four to five times backward and forward until it is at rest again. M. E. Burgh asserts that should this momentum during the oscillations of a chimney repeat itself in such a manner that its direction coincides with that of the oscillation, the overthrow of the chimney may be expected. This is the explanation given for the destruction of many a chimney constructed in accordance with sound principles of stability. The *Oesterreichische Zeitschrift für Bergund Hüttenwesen* adds to this statement the qualification that, in the case of a chimney near Vienna, 50 m. (164 feet) high, and constructed of concentric (hollow) rings, with an inner diameter at the top of 2 m. (6 $\frac{1}{2}$ feet), which is exposed to considerable gusts of wind, the oscillations were most carefully and repeatedly measured with a theodolite, when the observations showed an extreme oscillation of only 16 cm. (6 $\frac{1}{4}$ inches) during severe storms.

The American Well Works, of Aurora, Ill., have issued a 48-page illustrated "Treatise on Natural Gas and Oil," with illustrations and descriptions of tools and appliances. Several pages of interesting information are given regarding the discovery and properties of natural gas, together with the theories of its origin. These are followed by a full catalogue of boring appliances, including portable steam engines, artesian well rigs, oil well tools, the Hercules steam drill, hydraulic mounted revolving machines, horse-power revolving rigs, Chapman's revolving process and patent force expansion drills, hydraulic and jetting machine, pipes, fittings, &c.

Contracts for nearly 7000 tons of cast-iron water-pipe were placed by the city authorities of Chicago on the 16th ult. Six-inch pipe will be furnished by the Addyston Pipe and Steel Company, of Cincinnati, at \$24.85 per ton. All other sizes will be supplied by R. D. Wood & Co., of Philadelphia, at the following rates: Eight-inch, \$24.84 per ton; 12-inch, \$24.70 per ton; 16-inch, \$24.60 per ton; 24-inch \$24.40 per ton. These prices are stated to be at least \$3 per ton lower than the prices at which similar contracts were placed last year.

Representative Thomas, of Illinois, a member of the House Committee on Naval Affairs, has prepared an original design for a war vessel, which will be laid before the committee. The vessel is to be known as the pneumatic dynamite monitor. The estimated cost of the vessel is \$1,500,000.

Sheffield, like Manchester, wants a canal to the sea, and can have it by expending \$5,000,000 on a trench 50 miles long. A Sheffield paper says: "We have lost steel rails and ship-plates. There remain tires, wheels, axles and springs; armor plates, gun forgings, propeller blades, cranks and those mighty castings which require to be tugged by traction engines, for, if they go by rail, they want more room than Royalty itself."



Figs. 2 and 3.—Details of Wedge Adjustment.

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provision of law covers only forgings of the two metals combined or both forgings of iron and forgings of steel, and the proper rate of duty on the forgings in question, which are composed of iron alone is dependent on its solution. This question has been submitted to the Attorney-General, who under date of the 2d inst., reports that, in his opinion, the phrase "forgings of iron and steel" in said provision of law, and also in T. I., 167, which imposes a duty of $2\frac{1}{4}$ cents per pound on "forgings of iron and steel, or forged iron, of whatever shape or in whatever stage of manufacture," should be interpreted to include forgings of iron and also forgings of steel, and not alone those in which the two metals are combined in the same forgings. The Department accepts the opinion of the Attorney-General as to the proper interpretation of said provision of law, and you are hereby authorized to readjust the entry in accordance therewith, and to take measures for refunding the excess of duty. This decision revokes the Department's decision of May 16 last, in which the contrary view was held as to certain forgings of steel.

DUTY ON "REMELTING STEEL."

An article called "remelting steel," which upon further investigation was found to consist of the best quality of

and that the dutiable percentage of copper, if any, should have been ascertained by the dry or fire assay. The decision as to the liability of said copper to duty, being in accordance with T. I., 186, and the Department's decision of November 21, 1887, is affirmed. It appearing from the report that the method which was used in the ascertainment of the percentage of said copper is more accurate than that claimed by the appellant, the decision is also affirmed as to the quantity of dutiable copper found.

The lowest bidder for a new fireboat for the protection of the harbor of Boston was found to be Charles F. Elmes, of Chicago, when the bids were opened last week. Unfortunately his bid, though the lowest, was \$2000 above the limit allowed by the appropriation, and new bids were called for. He has again entered the lists determined to carry off the contract. He built the engines for the fireboats used in Chicago, which have proved very satisfactory.

On the 14th inst. two large agricultural implement warehouses at Peoria, Ill., with all their contents, were destroyed by fire. One belonged to Martin & Co. and the other to Kingman & Co. The destruction

THE WEEK.

The American Meat Company, just organized with their headquarters at Kansas City, Mo., are probably the most extensive company of the kind in the United States. The company have over 4,000,000 acres of land in Mexico and New Mexico, upon which they have at the present time 425,000 head of cattle. This large body of land is owned by the company in fee simple, and the company propose to go into the cattle-raising business on the widest scale. The cattle will be shipped to Kansas City, where they will be slaughtered in the large house erected for that purpose. J. H. Flagler, of Pittsburgh, through his connection with the McKeesport Tube Works, is president.

According to experiments conducted by the Health Board of New York, it appears that dry heat of even 280° is insufficient to kill disease germs, except in cases where the fabric is perfectly dry or so loosely rolled or folded that the heat can penetrate it. But by injecting live steam into the tank Dr. Edson's assistants have been able to disinfect clothing and bedding at a temperature of about 160°, and the goods come out of the tank unhurt, except that the colors in some kinds of cloth are effaced or badly mixed. The disinfection by steam is rapid and satisfactory. Iron cages are being prepared for the collection and return of bedding and clothing. Each cage has a lock to it, and the owners of clothing can keep the key while the goods are being disinfected. The work is done by the Health Department free of charge.

The labor unions of New South Wales are the ruling power. The American steamship Alameda, of the Oceanic Steamship Company, arrived at Sydney from San Francisco last month, having on board 33 Chinamen employed in the menial positions, such as shovellers and trimmers, which no American coveted. Otherwise, from the captain down, including waiters, engineers and porters, all were Americans. The amalgamated labor unions of New South Wales resolved that the Chinese must go, and accordingly the steamship officers were notified that unless the obnoxious Celestials were discharged the vessel would not be allowed to dock, land her cargo or to take new supplies of coal. While the Government authorities had under consideration measures intended for her relief, the captain so far weak ned that an agreement was signed to receive on board as passengers 21 members of the seaman's union who would supersede the Chinamen on arriving at San Francisco. All other lines converging at Sydney, report said, would be similarly purged. A Sydney correspondent says: "The laboring man is the real ruler of New South Wales, and dictates terms and conditions which suit himself and which are unquestioningly acceded to. Wages here are three times what they are in London, and yet the laboring man considers himself downtrodden, and continually makes new demands." The more thoughtful of the people deprecate the unreason of the wholesale denunciation of the Chinese, and apprehend grave complications with the Chinese Government unless more consideration and moderation are exercised.

Seventeen deadly bombs of the anarchist pattern were found in the scrap-iron pile of the Swift Iron and Steel Works, near Cincinnati, where it had been gathered from various sources.

According to the new rule just enforced at all the ports of the Island of Cuba, navigation duties have been suppressed for all vessels belonging to the nations with whom Spain has a commercial treaty, and in their stead a duty of \$1 for each ton of goods

landed and shipped has been established. This measure considerably increases the expenses on all goods imported and exported, as will be seen hereafter. A steamer measuring 1760 tons can load 3000 tons of goods, and will pay; on goods imported, \$3000; on goods exported, \$3000 to \$6000. Same steamer paid before, 6½ cents for each ton of measurement, \$1100. Difference, \$4900 more now than before.

Costa Rica has taken the initial step toward carrying into practical effect the project of a Central American confederation by decreeing that henceforth all citizens of Guatemala, Salvador, Nicaragua and Honduras shall enjoy all the rights and privileges of her own citizens when within her boundaries.

The value of imports of fruits, including coconuts, from the West Indies into the United States for the year ending June 30, 1888, was \$5,806,687.

The deficiency in the French wheat crop has already lead to unusually heavy purchases of wheat on the Pacific coast for direct export to France.

The first tea ship from China this season made the trip to New York in 65 days.

The Barings and other well-known houses will issue in October the stock of a company with a capital of £10,000,000, formed to work a concession to supply Buenos Ayres with water.

Duties are collected on merchandise arriving from Mexico by parcels post in accordance with a convention, which went into force July 1.

The firing of Cannon in Jacksonville as a protection from yellow fever is ridiculed by the New Orleans *Times-Democrat*. The editor says: "The concussion theory is as absurd as it is old. It was tried half a century ago in the Gulf cities, and its only effect was to kill by the shock nearly all the convalescents. The Jacksonville authorities have, it is true, warned the people of the salute and advised them not to be frightened over it, but this advice cannot always be followed by persons sick of the fever, and the cannonade is only too likely to be followed by an increased death rate, without the slightest good resulting from it. And it will undoubtedly have the effect of still further increasing the panic, as in an infected town nothing tends more to spread the gloom and feeling of terror than to have the sky overclouded with smoke and the minute guns steadily firing. If this does not cause the bravest Jacksonvillian to lose his nerves, nothing will."

At the meeting of the executive committee of the American Protective Tariff League, Stephen W. Roach, of New York, was elected manager in place of Garrett Roach, deceased, and ex-Governor Hoyt, of Pennsylvania, was elected general secretary of the League, in place of Joseph D. Weeks, resigned.

A tract of 110,000 acres of coal lands in Colorado, 60 miles north of Pueblo, is said to have been bought by a number of Pennsylvania capitalists for \$3,850,000. Some of the coal veins are 12 feet thick.

An invention to regulate combustion and to prevent sparks from locomotives has been patented by Robert H. Coleman, the ironmaster, of Lebanon, Pa. Report says that its value has been proven in practical tests.

Peru is suffering severely from the sudden collapse of paper money circulation. It is estimated that 60,000,000 paper sols guaranteed by the Government remain in private hands, and is practically useless, so that numbers of families in Lima and other principal cities are unable to buy the necessities of life. Consul Brent, in describing the situation, which he regarded as

almost hopeless, says: "Such a blow to a nation in such financial straits as Peru is to-day is hardly conceivable abroad."

Rumors come both from Ottawa and an agent of the New Zealand Government now in San Francisco that negotiations are pending between the Australian colonies and the Canadian Pacific Railway for a line of mail steamers to Vancouver and Brisbane on the termination of direct service via San Francisco next October. Should a contract be made, which seems not improbable, the bulk of American correspondence would go through the Dominion.

The coroners jury sitting in the case of the Chrystie street fire, by which a number of persons lost their lives, find that the building law requiring fire-escapes is inadequate in their application to factories where large numbers of working people are engaged, and recommend such revision as shall afford the needed protection.

The Manhattan Club offered a round \$800,000 for the Stewart mansion, without securing the property.

Austin Corbin has resorted to legal measures for the suppression of foul odors on Barren Island, where the city refuse is converted into fertilizers. He claims to have suffered to the extent of \$100,000.

The acting superintendent of the Maritime Exchange, in speaking of the sinking of the ocean steamship Geiser by the collision with the Thingvalla off the coast of Nova Scotia, said: "It seems almost impossible to prevent such accidents at sea, unless the masters of vessels adopt the plan of running very slow when the weather is thick. Captains are usually anxious to make good time." The ocean lane system, the acting superintendent thought, might be to a certain extent effectual, but people who go to sea should make up their minds that there are risks which they must assume.

There is no yellow fever in any part of Florida, excepting Jacksonville, Tampa and Manatee, and it is believed that it is not now epidemic anywhere. In Jacksonville last week the victims of yellow fever numbered only three.

The materials for the repair of the damaged steamship Thingvalla, at Halifax, will be forwarded from New York and Philadelphia.

Gen. J. L. Curtis, who has been nominated for President by the American party, is President of the Franklin Steel and Zinc Company, of New Jersey, and is interested in other steel and zinc projects.

There is talk at Detroit about the possibility of the Canadian Pacific Railroad making that city one of the principal points of connection with the United States railroad system by means of a tunnel.

The rising port of Tacoma, the center of a great wheat and lumbering region, will this year ship 80 cargoes of wheat, mostly from the Palouse country, in Eastern Washington Territory.

The President of the American Paper Makers' Association has collected reliable data showing that the paper trade which stood 21st in rank among American manufactures in 1880, is now 14th, and that the capital invested has nearly doubled in the last eight years. The annual product has far more than doubled in quantity, and in spite of lower prices is 75 per cent. greater in value. The number of employees is 40,000, against 24,500 in 1880, and the wages paid are more than twice the total in the last census year. The average per day for each worker was then \$1.13, and now it is \$1.50.

George N. Tatham died early Sunday morning at Jenkinstown, Pa., where he was spending the summer. He had been

ill for a long time. Mr. Tatham was born in Philadelphia in 1807, and had been for many years the senior member of the firm of Tatham Brothers, manufacturers of lead pipe. Henry B. and William P. Tatham, in Philadelphia, and Charles, another brother, in business in New York, survive.

So great are the improvements made in Germany in the navigation of rivers and canals that the total tonnage of the German river fleet is only a trifle under that of her whole merchant navy, being, according to the returns for 1885, 1,242,000 tons, against 1,294,000. A good idea of the part played by river navigation in the internal commerce of Germany may be gained from observing the relative proportion of land and water freight in the commercial returns of some of the leading cities. The following table comprises some of the more striking instances:

	Tons received—	
	By rail.	By water.
Berlin.....	3,504,000	3,348,000
Hamburg.....	1,191,000	3,221,000
Bremen.....	776,000	184,000
Mannheim and Ludwigshafen.....	1,778,000	2,041,000
Ruhrort, Duisberg and Hochfeld (ports of the Rhine).....	5,427,000	4,107,000

In the cases of Hamburg and Bremen sea tonnage is, of course, excluded.

The new twin-screw steamer of the Inman Line, the City of New York, and the Cunard Line's second-best boat, the Umbria, steamed down the bay on Saturday within an hour of each other, bound over a course 2850 marine miles long, for Queenstown. It is positively affirmed that they will not race, but it is just possible, as somebody has remarked, that they "will endeavor in a humble way to see which will get there first."

It is estimated that the city of Brooklyn will this year have a population of 800,000, and that five years hence there will be fully 1,000,000 people within the present boundaries.

By the death of Charles Crocker San Francisco loses a citizen whose property was worth \$40,000,000.

New York's Future.—The future of New York City is outlined by Andrew H. Green, ex-Comptroller and ex-Park Commissioner, whose offices contributed largely to the laying out of Central Park. He predicts the eventual absorption within the corporation limits of the town of Westchester, of the whole of Kings County, of Flushing, Newtown and Jamaica, in Queens County, and all of Staten Island, giving to the city an area of about 320 square miles, as compared with London with an area of 687 square miles. To effect this object Mr. Green would remove all obstacles, open ways, build bridges and make it cheap and convenient for anybody to live here. He says: "From the easternmost point of Staten Island to the northerly line of the city, being the southerly line of Yonkers, would be 32 miles. From the Battery to its extreme northerly line would be, say, 18 miles, and from the Hudson River to the easterly line of Flushing would be about 7½ miles. We cannot keep too constantly in mind that New York is and is to be the great manufacturing center of the continent. Its domestic is probably three times its foreign commerce. No impediment should be placed in the way of conveniences for continuing our hold on the great continental traffic which by all the rights of topographical advantages belongs here. The Hudson should be bridged, of course avoiding needless obstructions to the waterway. The great continental railway lines must be facilitated in establishing their terminals here. Where capitalists are willing to embark their money to open new ways to the city, to bridging and tunnel-

ing the adjacent waters, they should be encouraged, not opposed by vexatious legislation. Within a radius of 25 miles from the Battery in Jersey there are more people to-day than in Brooklyn, more than the whole State of Connecticut, and the day is not distant when the necessities of business and the convenience of administration will force a concentration of the various towns, cities and villages within this radius into one great municipality, with immense advantages for the accommodation of domestic traffic, and with excellent water facilities."

The World's Fast War Ships.

An interesting and valuable collection of statistics has just been laid before Congress, comprising the principal war vessels of all navies, classified according to speed. According to these, England has four armored and half a dozen unarmored cruisers that make 15 knots. Her armored 16-knot vessels include the Imperieuse and Warspite, of 8400 tons each; the Collingwood of 9500, the Rodney of 10,300, the Camperdown, Benbow, Anson and Howe of 10,600 each. She has building the Victoria and Sans Pareil of 10,470 tons each, and the Trafalgar and Nile of 11,940. Her six unarmored cruisers going 16 knots include four of the Leander class, 3750 tons each, while four more of the Blanche class, 1580 tons, are building. Passing to unarmored vessels of 17 knots, England has eight of the Archer class, 1770 tons, on which our gunboats of the Yorktown class are modeled. She has also the Surprise and Alacrité, 1400 tons; four vessels of the Mersey class, 4050, and the Polyphemus, 2640. Of British 18-knot vessels, the most remarkable are the armored Orlando, Undaunted, Australia, Narcissus, Galatea, Immortalité and Aurora of 5600 tons each, all but the two latter already built. The same high speed is ascribed to the well-known unarmored vessels, Iris and Mercury, 3730 tons, and to four small craft of the Grasshopper class, 525 tons. Great Britain's 19-knot vessels now building are the unarmored cruisers Melpomene, Magicienne and Marathon, 2950 tons, and the Barham and Bellona, 1800. Of 20-knot vessels, she has building the Medea and Medusa, 2800 tons; the Vulcan, 6620, and the Blake and Blenheim, 9000, besides seven small vessels of 735 tons. France has no fewer than four armored and 13 unarmored vessels of 15 knots. She has of 16 knots the armored Courbet built and the powerful Hoche, Magenta and Neptune, 10,581 tons each, now building. The unarmored Tourville and Duguesne are also 16-knot cruisers. Of 17 knots the most important vessel is the Sfax, 4480 tons, while there are four more unarmored cruisers of the Faucon class, about 1272 tons. In the 18-knot array we find the two most powerful vessels in the French navy, the armored Marceau of 10,581 tons and Brennus of 11,000. Then there is the swift unarmored Milan of 1550 tons, besides eight torpedo boats of the Bombe class, 321 tons. France of 19-knot unarmored vessels has the Forbin, 1848 tons, already built, and five others of the same class building. She has also under construction the Jean Bart, Alger and Isly of 4162 tons, the Cécille of 5766, and the Tage of 7045. She claims 20 knots for the armored vessel Dupuy de Lôme, 6297 tons, and also for the unarmored Davaust and Suchet, 3027 tons, all now building.

Italy has two big armor clads, the Duilio and Dandolo, of 15 knots, and half a dozen unarmored cruisers. She has three powerful armored vessels, the Andrea Doria, Ruggiero di Lauria, and Francesco Morisini, of 10,045 tons each, besides two unarmored cruisers, all going 16 knots. Of her three 17-knot vessels the most important is the unarmored

Giovanni Bausan, 3068 tons. But it is in her 18-knot vessels that Italy is incomparable, since these include the powerful armor clads Italia, 13,898 tons, and Lepanto, 13,550, already built, and the Re Umberto, Sicilia, and Sardegna, 14,000 tons, building, besides four small unarmored vessels. Her 19-knot unarmored cruisers are four of the Vesuvio type, 3530 tons, and five of the Dogali, 2200 tons, three of these nine vessels being already built. Finally, of small 20-knot torpedo craft she has nine of the Tripoli type, 741 tons, and six of the Folgore, 317 tons.

Germany has one gunboat built and half a dozen building of 15 knots. She has also the unarmored cruisers Prinz Adalbert and Leipzig, 3925 tons; the Alexandrine and Arcona, 2370 tons; the Charlotta, 3360 tons; the Freya, 2017. Of 16-knot vessels she has the unarmored Hohenzollern, 1700 tons; the Pfeil and Blitz, 1382 tons; the Ziethen, 975. She has no vessels of 17 knots, but she has under construction the Wacht of 1240 tons, which is expected to go 19 knots, and the Grief of 2000, for which 20 knots are promised. She has also three unarmored vessels building, the Irene, Princess Wilhelm, and one other, of 4400 tons each, which are to make 18 knots.

Spain has an armor clad, the Pelayo, of 9902 tons, which makes 15 knots, besides two unarmored cruisers of 3342 tons each, two others of 1152 tons, two of 1030, and four of 1055. She has none classed as 16, and none as 18-knot vessels; but of 17-knot unarmored cruisers she has the Arragon of 3342 tons, and the Reina Cristina, the Reina Mercedes, and the Alfonso XII, each of 3090. Spain is becoming famous for fast war vessels, and has under construction no fewer than six armored 19-knot cruisers of 7000 tons each, a little larger than our own Maine and Texas, of which only 17 are expected. She has also already built the famous unarmored Reina Regente of 5600 tons, making 20 knots, the fastest vessel of her class in the world. This cruiser may be practically the model for the new 20-knot unarmored vessel of 5300 tons displacement provided for in the pending House Naval Appropriation bill. Spain has also the Destructor, of 458 tons, a 20-knot vessel, and both of the Reina Regente and of the 20-knot torpedo types she is building three more vessels each.

Russia has one armored and three unarmored vessels of 15 knots, and is building three armored vessels, the Tchesma, Sinope, and Catherine II, of 10,181 tons each, to go 16 knots. She also has five middle-class ironclads, the Dmitri Donskoi, of 17 knots, and the Admiral Nachimoff, Alexander II, Nicholas I, and Pamjat Azova of 18 knots. She has an unarmored cruiser of 19 knots, the Admiral Korniloff, and two small craft of 20 knots. Brazil has her famous Riachuelo of 16 knots and Aquidaban of 15, besides the unarmored Almirante Tamandaré of 17 knots. Chili has the renowned Esmeralda of 18 knots, and a larger vessel building of 19 knots. Austria has one armored vessel of 16 knots and one of 17, besides two unarmored cruisers of 19 knots and one of 18, with three small torpedo boats of 20. China's armored vessels include one of 15, two of 16, and one of 17 knots, while she has four unarmored cruisers of 15, four of 16, and two of 18 knots. Japan has three armor clads, the Itsukushima, Matsukushima, and Haki-dati, 4140 tons each, of 16 knots, and an unarmored cruiser of the same speed, and she has three vessels of the famous Naniwa type, 3650 tons, and 18 knots.

Mr. James Skelding, manager of the Low Moor furnaces, at Low Moor, Va., died on Sunday, August 5, of dropsy of the heart, and was buried at Ironton, Ohio, on August 8.

MANUFACTURING.

Iron and Steel.

The Sharon Iron Company, of Sharon, Pa., signed the Amalgamated scale last week, and operations have been resumed in all departments.

The Lawrence Furnace Company, of Ironton, Ohio, propose to build a 30-ton coke furnace in the vicinity of their present idle charcoal furnace at Culbertson, Lawrence County.

In our issue of last week we made mention of the sale of the Coatesville Iron Works at Coatesville, Pa., to Worth Brothers of that place, for the sum of \$41,050. These works were formerly known as the Viaduct Iron Works, and have recently been operated by Andrew Williams, of Plattsburgh, N. Y. The property includes over 100 acres of land upon which are four rolling mills, fully equipped, a grist and saw mill, eight double and six single tenement houses, and a number of other buildings. The mills were successfully operated for many years by Steele & Worth, and of late times have been in the hands of the Coatesville Iron Company, as whose property they were sold by the sheriff. The purchasing firm consists of J. Sharpless Worth and William P. Worth, sons of S. B. Worth, of the former firm of Steele & Worth. They now own and operate rolling mills in Coatesville, erected by themselves a few years ago, and it is their intention now to operate both these and the Viaduct Mills.

The large rolling mill of the Wheatland Iron Company, at Wheatland, Pa., owned by the Woods heirs of Pittsburgh, will soon be put in operation, after an idleness of more than ten years. The plant was built in 1872, and contains 13 double puddling furnaces, 12 heating furnaces, and three trains of rolls, and was built for the manufacture of skelp iron. The works have been idle on account of legal trouble. A new company, composed of Woods' heirs, has taken charge of the plant and will run it steadily. Bar iron will be the chief product, and nearly 300 men will be employed.

Judge Ewing, at Pittsburgh, has confirmed the sale of the mills of Graff, Bennett & Co. to James W. Friend, Jos. M. Bailey and James Richards, as trustees for the syndicate of creditors, mention of which was made in our issue of last week.

The plant of the Penn Iron Company, Limited, of Pittsburgh, was closed down for an indefinite period on Saturday, the 18th inst., on account of dullness in the iron trade. About 300 men were thrown out of employment.

The Warren Iron and Steel Company's big mill has resumed work after an idleness of five years, with the exception of a month's run last year. The 400 men go on double turn immediately.

The Warren Tube Company's plant, at Warren, Ohio, was offered for sale recently by Sheriff McKinley to satisfy a judgment obtained by creditors. No bids were received and the works will be re-appraised and offered for sale again. The selling price could not be less than \$77,000, which parties desiring to buy considered too high.

All departments of the plant of the Columbia Iron and Steel Company, at Uniontown, Pa., have been put on double turn in order to keep pace with the large orders which the firm have on hand.

James P. Witherow, engineer and contractor, of Pittsburgh, has received a contract for the erection of three blast furnaces for the De Bardeleben Coal and Iron Company, of Birmingham, Ala. The fur-

naces will be built at Bessemer about four miles from Birmingham. It is stated that the above-named firm will erect two more furnaces in the near future, and that Mr. Witherow will also build them. This large contract will keep the works of Mr. Witherow, which are located at New Castle, Pa., in operation on double turn for the balance of the year, and will give employment to about 200 men.

The employees of P. L. Kimberly & Co., Limited, proprietor of the Greenville Rolling Mills, at Greenville, Pa., have received one-half of the back pay due them at the time of the recent shut-down. The other half will be paid in two weeks.

The Pittsburgh Steel Casting Company, of Pittsburgh, have commenced work on the castings for the new Government cruiser Maine, a contract for which work has been secured by this firm. The patterns have not all been received yet, but, it is understood, some very heavy castings will be required.

Only three firms in the country have not as yet signed the Amalgamated scale. They are: Dilworth, Porter & Co., Limited, proprietors of the Glendon Rolling Mills, Pittsburgh; Whitaker Iron Company, Wheeling, W. Va., and the Globe Rolling Mill Company, Cincinnati, Ohio. It is expected that all of the above firms will sign as soon as repairs are completed and they are ready to start their works.

Lucy Furnace No. 2, of Carnegie Bros. & Co., Limited, at Pittsburgh, was blown out on Friday, the 17th inst., for the purpose of being relined and otherwise repaired.

The nail department of the Atlantic Iron Works, of P. L. Kimberly & Co., Limited, at Sharon, Pa., which has been idle for some months, resumed operations on Tuesday, the 14th inst.

The charcoal furnace of the Duluth Iron Company, at Duluth, Minn., built in 1872-73, has been definitely abandoned. It has been idle since 1883.

A dispatch from Bellefonte, Pa., under date of the 16th inst. reads as follows: "The Howard Iron Works' property has been levied on by the sheriff and is advertised to be sold on the 28th of August. The ironworks proper are situated in Howard township, near the borough of Howard. They consist of a rod wire mill, a bar mill, a muck bar mill, a machine shop, rolling mill, &c., with a charcoal furnace, 15 tenement houses, a store house, private dwelling, and all the ore and timber lands situated in Howard, Marion and Walker townships, with washing machinery, aggregating 1155 acres. The Howard Iron Works have not been in a very flourishing condition for several years. They have been owned and managed principally by Bernard Lauth, who has produced several very valuable patents, among which is the cold rolled iron process. One of Mr. Lauth's patents was a process for rolling steel plate for nails. This was tried in the Bellefonte nail works, but was abandoned after a thorough trial."

The steel department and rail mill of the North Chicago Rolling Mill Company's South Chicago plant were shut down temporarily on Tuesday of last week. The blast furnaces were continued in operation. The cause of the stoppage of the rail mill was the lack of orders for immediate delivery. Work will again be resumed toward the close of the month or early in September, to roll rails for which contracts have been taken for such deliveries. In the meanwhile it is hoped that more orders will be received to insure a steady run from that time.

Winona Furnace, of the Columbus and Hocking Coal and Iron Company, in the Hocking Valley, has blown in.

The work of dismantling and removing the boilers, engine, machinery and ironwork of the Monocacy Furnace, at Monocacy, Pa., has been commenced. One nest of boilers, the engine and fly-wheel will be taken to Norway Furnace, at Bechtelsville; the large tanks and a lot of other ironwork and machinery will be sent to Pottsville, while another nest of boilers and other portions of the plant will be shipped elsewhere.

A notice has been posted in the Penn Roiling Mill, Lancaster, stating that the finishing department will continue operations, the puddling department along suspending.

The North Branch Steel Company, at Danville, Pa., No. 2 furnace, Mr. F. E. Bachman, manager, made during the week ending August 14 476.5 gross tons of pig iron on a fuel consumption of 1.14 tons and limestone, 0.78 tons per ton of iron. The ore mixture averaged 53.81 per cent. and the temperature of blast 855°. The best week's work of this furnace under any previous management, with identically the same equipment, was 216 tons on an ore mixture giving 51.28 per cent. iron, a gain of 121 per cent. in output to the credit of Mr. Bachman. The fuel used was one-half coke, one-quarter Schuylkill and one-quarter Kingston anthracite coal.

The Charlotte Blast Furnace, at Scottsdale, Pa., which has been idle for the last year on account of trouble between the company and men over an advance in wages, which the company refused to give, is getting ready to resume operations again. The coke ovens have already been fired.

It is expected that the first forgings at the new gunshop of the Bethlehem Iron Company, at Bethlehem, will be made toward the close of this month.

A second of the furnaces of the Troy Steel and Iron Company is about to blow in, if, in fact, it is not already in blast at this writing.

The Troy Steel and Iron Company have put in new boilers at the steel mill. It is the intention to run one-half the boilers with coal and one-half with oil as fuel. It is expected that thus accurate comparative data will be gathered.

Machinery.

The Chicago Car Wheel Company, of Chicago, have made extensive improvements in their works this summer. All lifting will hereafter be done by hydraulic power. Tracks have been laid through the foundry to take the liquid metal on trucks to the molds, and afterward to convey the wheels to the annealing pits. The molds will be arranged in a straight line instead of a circle. The machinery will be run to and fro by friction. The result of these improvements is to place all the machinery under the control of the molder and helper, who will be able to perform their work with less exertion and greater expedition. A new engine has also been put in which is of sufficient power to operate the entire machinery, replacing two engines formerly used. The annealing capacity has been increased by the addition of 15 boiler iron pits to anneal without draft. N. S. Bouton, president of the company, prefers these to the draft annealing pits. He used draft pits 25 years ago, but began to use the other method 18 years ago, introducing improvements from time to time in the manner of placing them. These works have a cupola capacity for the production of 300 wheels a day, but do not usually aim to make over 250. Improvements are also being made at Bouton & Co.'s car-

wheel works at Aurora, Ill. Hydraulic lifts have been put in, and two of the molding floors are already supplied with tracks for the passage of trucks with molten metal and for the transfer of wheels to the annealing pits. At present the demand for car-wheels is not active, but the manufacturers look forward to a revival of business by next spring at the latest.

Charles Kaestner & Co., of Chicago, have recently taken a number of important contracts for machinery. They are furnishing the Keating Marble Works a new engine and boiler; the Chicago Brewing Company their entire outfit, consisting of the Kaestner patent mashing machine and grain remover, malt mill and draining reel; a 60-horse-power engine, &c.; the Curry Mfg. Company, a 72-inch lead chaser, a 2500-pound power mixer, a 30-inch lead and zinc mill with cooler, and double water-cooled japan mills.

The Bouton Foundry Company, of Chicago, are making additions to their machinery with the view of enabling them to complete all classes of work in themselves as far as possible. Among the latest machines they have purchased is a mill capable of handling pieces 16 feet in diameter and 5 feet in height. It will bore at any angle and will turn large castings with ease.

The Harrington & King Perforating Company, of Chicago, are building up a large export trade, their business with foreign countries this year being heavier than ever before. They are shipping perforated metal to Australia, South Africa, South America, and in fact to all parts of the world in which gold mining is carried on.

The National Pneumatic Tool Company, have been incorporated at Chicago with a capital of \$200,000. The incorporators are Charles D. Woolwich, Harry Hunter and John Platner.

At the annual meeting of the stockholders of the Pittsburgh Motor Company, held in the office of the company, in Pittsburgh, last week, the following officers and directors were elected: President, John E. Ridall; vice-president, James B. Scott; secretary, W. L. Eaton; treasurer, F. C. Hutchinson. Executive Committee: C. L. Magee, James B. Scott and John E. Ridall. Board of Directors: C. L. Magee, James B. Scott, H. S. A. Stewart, John E. Ridall, C. C. Scaife, A. M. Nepper, John L. Blackwell and George Renault. The three last-mentioned gentlemen are residents of New York. The territory of the Pittsburgh Motor Company embraces Pennsylvania, Ohio and West Virginia. It was this company which constructed the Observatory Hill Electric Railway in Allegheny. It has no roads in course of construction at present.

The Westinghouse Air Brake Company have awarded the contract for the foundation of their large works on the Pennsylvania Railroad, near Wall's Station, and work has already commenced. The cost of this part of the structure alone is estimated at \$150,000. Among the structures to be built for the company, and for the foundation of which the contract was let yesterday, are the machine shop, the foundry, the boiler house, the blacksmith shop and the shipping shop. The machine shop is to be 500 x 250 feet, the foundry 500 x 300 feet, the boiler house 160 x 80 feet, and the blacksmith shop 250 x 150 feet. A. Peebles is the architect, and when these buildings are completed ready for the machinery they will not have cost less than \$850,000 or \$1,000,000.

During the last six months the Union Mfg. Company, of New Britain, Conn., have added considerable new machinery, including patterns, tools, &c., to their chuck department, which is now one of

the largest in the country. This firm manufacture lathe chucks in 3 to 42 inches, inclusive, and with two, three and four jaws. We also understand that they make special styles of jaws and drawings. Their chucks are used very largely in this country, and we are informed that they have had a considerable sale abroad.

The Harrison Machine Company, of Belleville, Ill., have manufactured and shipped this season 320 separators, 95 engines and 85 straw stockers.

The Southwestern Agricultural Works, A. G. Munn, president, report business good. They make specialties of saw mills, cane mills and evaporators, grain drills, cider presses, feed and straw cutters and corn shellers. Owing to excellent crop prospects the demand for some of their agricultural implements has more than doubled that of last year. Their salesmen report as an indication of prosperity through the cotton belt that the farmers have a largely increased area in corn planted, and this fact which concerns the company so closely has caused them to manufacture their goods more extensively than ever. They have this year placed several of their improved saw mills down on the South Atlantic Coast in the yellow pine belt.

Miscellaneous.

William F. Remppis & Co., of Reading, Pa., manufacturers of wrought-iron railings, fences, fire-escapes, &c., have removed to their new establishment on the river front, near the Lancaster Bridge, in that city. Another addition has just been erected, and they now have better facilities than ever for attending to their business. They are engaged at present in preparing the window grates for the Pennsylvania Trust Company's new building, and have enough orders on hand to keep their establishment busy during the coming fall and winter.

A great deal of red tape is being played out in the matter of the Louisville and Jeffersonville Bridge. The promoters of the enterprise, who believe the bridge will be a great benefit to both cities, strongly advocate a certain location connecting the centers of business of the two sides of the Ohio River. They are bitterly opposed before the War Department by the Louisville and Jeffersonville Ferry Company, who are doing a lucrative business between the cities, which the bridge would naturally interfere with. Most of the river men have sided with the ferry company in the fight, urging that the location of the piers just in the upper part of the harbor would greatly endanger the coal fleets and large boats as they "round to" preparing to go down the falls. This view should be thoroughly studied, as the Louisville harbor is a very important one, through which all boats going over the falls or down the Portland canal have to pass, and the Secretary of War is weighing the matter carefully and has given the opponents 30 days to file their protests. As Congress has already granted the right for the bridge to be built across the river, the objections now are purely as to location, the river men wanting it put in the upper ends of the cities, which would virtually kill it. Dennis Long, the venerable and successful foundryman, of Louisville, is at the head of the enterprise.

The shipowners of Nova Scotia and New Brunswick are united to secure such legislation as shall prevent the construction of more timber rafts for export.

The collapse of the strikes in Paris is due largely to the unexpected firmness of the Floquet Ministry.

The Connellsville Coke Trade.

Within the last month or so a decided improvement in the coke trade, both as regards price and demand, has taken place, and the operators in the Connellsville region are greatly encouraged with the outlook for the future. Since last March this important industry has been in a very demoralized condition, and with the low prices at which coke has been sold, it is extremely doubtful if the operators have made any money during the last six months. In January of this year coke was selling freely at \$1.75 per ton, and the majority of the ovens in the region were being operated to supply the demand. In March a reduction of 25 cents per ton took place, and in the latter part of that month another fall took place, which put the selling price at \$1.25 per ton, lower than it had been for years. When this low price was reached the operators claimed that there would be no further decline. In this, however, they were mistaken, as in April another decline of 25 cents per ton took place, which put the price at \$1 per ton, and with a demand barely sufficient to keep half the ovens in operation. The market continued in this condition till the beginning of the present month, when a decided improvement set in, and where a month ago the operators were only too glad to dispose of their product at \$1 per ton, they now refuse to make contracts for future delivery at less than \$1.25 per ton, and it is believed that before many days the price will have advanced to \$1.50 per ton. One of the largest operators in the region, whose headquarters are at Pittsburgh, took a contract last week to furnish a number of cars each day until January 1, 1889, at \$1.25 per ton. Less than a month ago there were not over 60 per cent. of the ovens in the entire Connellsville region in operation, and they were running only four days per week. At this time there are more than 75 per cent. of the ovens in operation and they are running six days per week.

The reason advanced for the improvement in this industry is the resumption of the mills in the West that were idle during the recent lockout, if it may be so called, and the blowing in of a number of idle blast furnaces, which, of course, would greatly increase the demand. In Pittsburgh and the Mahoning and Shenango valleys the mills and blast furnaces are more generally employed now than at any time this year, and the demand for coke from these sections is particularly heavy. The same is true of Wheeling and other points in the Ohio Valley, where the demand for coke at the present time is very large. In connection with the improvement in the condition of this industry comes the report that an attempt will soon be made to form another coke syndicate, and that steps have already been taken looking to the consummation of this object. To this report, however, but little significance is attached by those familiar with the trade. During the early part of the year, when attempts were being made to revive the old syndicate, it was pointed out that success depended upon including all the large operators, and that would be necessary to-day. One of the largest firms in the region, who were charged by the other operators with being the cause of the disruption of the old association, have absolutely refused to support any attempt made to form a new syndicate, and for this reason we repeat our statement that without united action all attempts will go for naught. The reason advanced by this firm for their refusal is that the old syndicate has refused to pay to them a large amount of money on account of contracts taken for coke at a low price. Until a settlement is made with this firm and their co-operation is secured it will be impossible to form a coke syndicate.

The Iron Age

New York, Thursday, August 23, 1888.

DAVID WILLIAMS, - - - PUBLISHER AND PROPRIETOR.
CHAS. KIRCHHOFF, JR., - - EDITOR.
GEO. W. COPE, - - - ASSOCIATE EDITOR, CHICAGO
RICHARD R. WILLIAMS, - - HARDWARE EDITOR.
JOHN S. KING, - - - BUSINESS MANAGER.

The Iron Age Index.

A complete Index for Volume XLII, January to June, 1888, is now ready. Subscribers desiring to have a copy should apply early, as only a limited number have been printed.

Heavy Ordnance for Fortifications.

A perplexing struggle has been going on in both Houses of Congress, during the past week, over the legislation which is to provide for heavy ordnance for the army. Briefly stated, the course of events during the present session has been as follows: The House framed an army appropriation bill providing for funds for the usual routine expenditures, to which the Senate added \$5,000,000 for rough steel gun forgings for heavy ordnance, and \$750,000 for providing machinery and equipment at the Watervliet Arsenal to assemble the parts of heavy guns and finish them. The House declined to concur in the Senate amendments, and some discussion accompanied by attempts to delay action grew out of the question whether the Military Committee or the Appropriation Committee should represent the House in the conference. The former carried the day, and the representatives of both Houses quickly agreed upon a compromise. It simply appropriates \$3,500,000 for steel forgings for guns, a reduction of the sum originally proposed of \$1,500,000. No caliber is specified, nor are any further expenditures in later years planned. The point was debated at some length whether such a sum would be sufficient to secure to the Government the benefits of competition among private manufacturers, and objection was raised to the fact that the bill confines army officers to the purchase of built-up guns—that they have no discretion to take any other method. The conference cut down the appropriation for the Watervliet Arsenal, at Troy, to \$700,000, and in that form passed the Senate, the House not having voted on it as yet.

In the meantime the House has passed a far more elaborate bill, under the title of the Fortifications bill. It embodies a far more comprehensive plan of providing for the defense of the country by calling for not less than fifty 12-inch, twenty 14-inch and twenty 16-inch breech-loading steel guns, for not less than thirty 12-inch breech-loading cast-iron guns, and not less than fifty 12-inch cast-iron mortars. The time estimated in order to complete and test five experimental guns is 4, 4½ and 5 years respectively for the steel guns and for the other ordnance 20 and 16 months respectively. The steel guns, it is believed, can be completed in 10 years for the smaller calibers, 11 years for the larger guns and 13 years for the 14-inch

guns. It will be observed that the bill especially takes into consideration the views of those who insist that iron guns are a weapon serviceable under modern conditions of warfare.

The estimated cost of the contracts may, according to the promoters of the bill, reach \$13,255,433, proportioned as follows: For the purchase of steel guns, \$8,804,980; cast-iron guns, \$750,000; mortars, \$300,000; gun carriages, \$3,446,457, and mortar carriages, \$350,000. No contract is to be made which will require an expenditure exceeding, in the aggregate, the sum of \$13,255,433, nor an expenditure in any one year, greater than \$2,500,000, the present appropriation made being \$2,477,670. A special board is to carry out the work of providing the heavy ordnance, consisting of three officers of the army and three civilian, engineers, of whom at least one must be experienced in "the quality and working of steel." These civilian members of the board are to receive a salary of \$5000 per annum.

An important provision in the bill is that "no money shall be expended except for steel accepted and delivered, and no contract shall be made for gun steel at a greater average price per pound for each caliber than the lowest average price charged under contracts hitherto made by the Government for forgings of like caliber." The idea underlying this provision appears to have been that since steel has been growing cheaper during the last 20 years, therefore in the future successive bids must be as low, if not lower. There seems to be a great though unfounded dread that there will be no competition for Government gun-steel contracts. It was distinctly and emphatically stated by some of the opponents of the bill that the Bethlehem Iron Company will demand whatever price it chooses to name, and that the Government will be practically helpless. The critics alluded to did not even know that the Midvale Steel Company have made a considerable number of forgings of large caliber, and that the Cambria Iron Company have taken some contracts. We believe that with the adoption of a comprehensive plan for fortifications, giving steel makers a reasonable assurance that the demand for heavy guns will not collapse after a year's spurt of generosity, more than one responsible concern will be found willing and anxious to engage in the work or to extend present facilities. The House fortification bill holds out the promise of such inducements, which, coupled with the requirements of the navy, would insure to both arms of the service an ample supply of the best material.

The Fortification bill has passed the House. It remains to be seen whether it will carry the day over the conference compromise accepted by the Senate.

A good many newspapers continue persistently to speak of a number of "trusts" in the iron trade. When at any time during the past year any report reached the daily press that a trust had been formed in any department of the trade, the industrious compilers of trust literature added one to their little list. The result is startling, to say the least. Sanguine nail-makers have been talking of arranging a combination for many months past. Plan after plan has been suggested only to fail, cut nails in the meantime selling at \$1.75 to

\$1.85 at mill, East or West. Competition of the liveliest kind has kept values down to the unremunerative figures mentioned, and yet the opponents of "trusts" are serenely carrying along the nail trust among the catalogue of iniquitous monopolies. Lead is another one of the articles afflicted with the reputation of being under the control of a trust. It acquired it from the fact that a smelter in New Mexico, a refiner in St. Louis and a manufacturer in the same place pooled their issues. That operation was merely a consolidation of interests, and together they do not handle 3 per cent. of the whole output of the metal. Competition among producers and refiners of the metal is as keen as it is among the New York dailies, and the only shadow of a trust in the trade is the persistency of the leading speculator in the metal in trying to hold it up in spite of growing production and a stagnant demand. Another representative "trust" is that in copper. A clique of French operators believe that they can corner the supply of the world for three years to come, and have bought the output of the leading mines in all countries, among them those of this country. Their trust in the future is generally regarded as sublime, but no one knowing the facts could very well indicate how such a gamble can be compared to what is ordinarily known as a trust.

The Manufacture of Tin Plate.

A short time since we gave place in our columns to a suggestion on the tin-plate question which has provoked considerable discussion. This was expected, and it would have been a disappointment if no notice had been attracted by the novel proposition which was set forth. There are many persons connected with the iron trade who think it nearly time that the tin-plate problem was seriously taken in hand, and they believe that the sheet-iron manufacturers are the people who should do it. These gentlemen approve the suggestion that was made. Others, however, viewing the matter in what they term a pure business light, see no opportunity for an immediate return on the investment which would be necessary, and they therefore oppose it. The adverse criticisms which have been made have often been quite amusing, their authors seeing in this subject a wide field for the display of facetiousness. Their humor is appreciated, but in this particular case it seems to be misapplied, as the various interests involved are of too great importance to be trifled with.

The proposed method of attempting to establish a tin-plate industry in this country, by the erection and operation of works built by the united subscriptions of sheet-iron and galvanized-iron manufacturers, has not been put forth by its advocates because they expect to create a lucrative investment for idle or unproductive capital. As we understand it, the suggestion has been made primarily in the interest of the sheet-iron trade of the country. If the manufacturers of fine sheet iron speak with a full knowledge of the subject, and they should certainly be able to do so, their prosperity and the regular employment of their workmen at good wages would be seriously interfered with if tin plate should

be put upon the free list. As they would suffer most, it would seem to rest with them to institute vigorous measures of defense.

This is not a question of "fairness," which Mr. Cronmeyer calls up in his communication on the subject in another part of this issue. Unfortunately, our tariff laws are not constructed so as to treat all interests fairly. They never have been and probably never will be. Mere verbal argument and demonstrations on paper are apparently no nearer accomplishing the establishment of an American tin-plate industry than they were five years or ten years since. It is urged that the question now before the sheet-iron manufacturers is how shall the practical difficulties of the situation be met? "It is a condition not a theory" that confronts them, and it should be met in a practical way. It is not a question of philanthropy but pure business. Those who favor the suggestion argue that the sheet-iron manufacturers would risk five dollars to save probably twenty-five.

Appeals to Congress for an increased duty on tin plates have been made for years without success. The great possible benefits of such a policy to the trade of the country at large have been set forth in as vigorous language as it was possible to command. The answer has been steadily made by members of Congress that there is no tin-plate industry in this country, and that it would be an absurdity to double the duty on an article which must be imported, especially when the national Treasury is gorged with surplus revenues. When told that increased duties would create the industry they are ready with the reply that they must first be convinced that tin plates of good quality can be made here. The experience of the small works in existence 12 to 14 years since is too old to use with effect now. Hence arises the suggestion, put forward almost as a forlorn hope, that a practical demonstration should be given of the ability of Americans to produce tin plate, and the rate at which it could be made when paying the prevailing prices for labor.

The movement in favor of free tin plates is continually gaining in strength, and every month adds to it that sees no step being taken by American manufacturers to establish the industry here. Many persons who class themselves as protectionists are now in favor of free tin plates, as they claim that the question of protection is not involved in the present discussion of the duty on this article. The duty of 1 cent per pound may not be sufficient to entirely cover the difference in the cost of manufacture here and abroad, but it certainly goes much further than no duty whatever. The strongest argument now made in favor of the abolition of the entire duty is that it has existed for years without contributing to the establishment of a single tin-plate works in this country, and it is regarded by consumers as an altogether unnecessary tax on them. They take no account of the indirect effect this duty has on the sheet-iron trade, or if they do understand it, they choose to completely ignore it. The manufacturers of fine sheet iron are even now well aware that for stamping purposes a large part of their product is being displaced by tin plate, which can be had at a lower price. If the duty on tin plate should be entirely re-

moved they would be affected very much more severely; and once off it would only be restored under the stress of some great public convulsion like our late civil war. It is urged that they should "carry the war into Africa" and retaliate on the foreign tin-plate manufacturers, and it is insisted that it would be folly to postpone action until after tin plate has been made free.

Brazil Since the Act of Emancipation.

It is fortunate for Brazil that Dom Pedro II recovered his health and is now on his homeward voyage, as his conciliatory spirit is likely to prevail, and the planters will receive some sort of compensation for the sudden loss of their slaves by the law of May 13. Baron de Cote-gipe's bill to give the ex-slave owners 200,000,000 milreis compensation, or \$104,000,000 American gold, received its quietus on July 18 last, the Senate throwing it out by a vote of 29 to 13. This was a foregone conclusion, and, in fact, the efforts of its supporters to provoke a debate, or at least to postpone the *coup de grâce* until later in the session, only served to manifest that the refusal of the planters to listen in former years to any proposal to fix a definite date for ending slavery had completely alienated the great majority of the Senate. It created the feeling that in losing all the planters had but received their deserts. As in the Chamber of Deputies the same feeling is also largely prevalent, the Government measures for the relief of planters, by furnishing them with money at 6 per cent. interest, are met with active hostility, so that on July 21 the bill for establishing mortgage banks with 5 per cent. guarantee on their issues had only arrived at the second reading of the second clause. The Government, indeed, is just now between the proverbial two stools—the abolitionists are bitterly opposed to any favor to the planters, while the latter look upon the proposal to lend them money on mortgage as a veritable insult to men claiming to be ruined by what they consider an iniquitous law. Republican meetings, are, therefore, the order of the day.

Whether and to what extent labor on the plantations will be disorganized time will show. Before the act of emancipation was passed there was a tendency on the part of slaves in the coffee districts to leave the estates by hundreds, and take to the mountains, in a good many localities. This was during last winter and spring; now that they are free we hear of no disorders of any kind so far, and the large coffee crop is being brought under shelter without difficulty or delay. Most of the coffee planters themselves, to tell the truth, have grown rich during the last three years; if last year's crop showed a great deficit, the price obtained compensated for it, and as for the sugar planters, the prices the crop now beginning to be marketed is likely to bring will be higher than they have obtained during half a dozen seasons in succession. At no time since September, 1871, when the first steps toward abolition were taken, were Brazilian coffee and sugar planters in better position to face this sudden loss than at present, and, as Dom Pedro II stands above the contending parties, he will not

find it a very difficult task to bring about a compromise, and thereby remove the danger of revolution upsetting his monarchy.

The new coffee crop now beginning to arrive on our shores is estimated at 5,000,000 bags Rio and 2,500,000 Santos.

The shipments during the previous four crop years from Rio and Santos, taken together, were as follows, in bags of 60 kg., July 1 to June 30:

	1887-88.	1886-87.	1885-86.	1884-85.
To Europe.....	1,288,900	3,053,083	2,162,084	2,926,567
To the United States.....	1,715,217	2,582,617	2,897,400	3,063,433
To other countries.....	108,050	134,033	125,000	141,667
Totals.....	3,112,167	5,769,733	5,184,484	6,071,667

Sugar crop prospects are fair. The shipments from the last crop, drawing to a close with the month of June, were as follows from Pernambuco up to July 7:

	1887-88.	1886-87.	1885-86.
	Tons.	Tons.	Tons.
To Europe.....	58,245	12,108	13,349
" the United States.....	69,329	54,482	46,740
" South America.....	38,140	68,051	29,415
Totals.....	165,714	134,641	89,504

The central sugar house system seems to work so well at Pernambuco and Bahia that Brazilian sugar crops are assuming larger proportions year after year, provided the canes get rain enough.

India-rubber, next in importance, shows no falling off in production; on the contrary, it is on the increase. In 1886-87 the export from Para was 13,390 tons, being 390 tons in excess of that in 1885-86. This year the demand is greater than ever, and high prices prevail. The United States take about half of what the Amazon Valley turns out. Our import of india-rubber during the fiscal year ended June 30, three-quarters of which was Para, direct or via Liverpool, was as follows:

	1888.	1887.
	Pounds.	Pounds.
Imports.....	36,628,351	28,649,446
Re-export.....	377,731	638,317
Net import.....	36,250,620	28,011,129
Increase.....		8,239,491

This is an increase of about 30 per cent.

Hides have risen 1½ cents in our market in a little over a month. We received from Rio Grande do Sul last year at New York alone 68,836, against 82,639 in 1886 and 106,252 in 1885. There is, indeed, hardly a Brazilian product not in good position to-day. This will assist in smoothing matters in the Empire; it will improve the finances which are recently more flourishing than they have been for ten years past, and so is the exchange on London, now as high as 26½ pence per milreis.

Our export to Brazil is likely to be large this year, especially that of flour. During the calendar year 1887 we exported to that country domestic merchandise to the amount of \$7,103,845, against \$7,477,466 in 1886, while we imported thence \$56,377,719 worth of products, as compared with \$43,266,477 the year before, the great increase being due to the advance in coffee.

We believe that since 1872 and 1873—when coffee was high—Brazil has not been flourishing to the same degree as it has done since 1885. To have at length got rid of the slavery problem is as much a blessing to Brazil as it has proved to Cuba, and the former has at least the advantage over the latter that in the coffee regions white men can work. Perceiving this the planters are procuring agriculturists from

the north of Spain and other suitable localities, and in this manner disorganization of labor of a serious kind may be avoided.

CORRESPONDENCE.

Undervaluation of Steel Blooms.

CHARLEROI, BELGIUM, August 10, 1888.

To the Editor: I see to-day only that in *The Iron Age* of the 5th of July last you published, under the heading "Undervalued Steel Blooms," an article quite contrary to the truth, and against which I must protest at once. As all the matter in question depends now on a lawsuit which I instituted here and in your country against the parties named I cannot discuss in your newspaper all the facts you describe, but I can already tell you that I am suing the calumniators, claiming \$50,000 damage for their false reports.

I have no profit to undervalue any steel blooms, as I always sold any steel blooms f.o.b. Antwerp, and "the risk of duties is for account of buyers," as usually done in the steel business and often reported in your own newspaper. No European seller, unless he is an inexperienced man, would do otherwise with your ad valorem system of duties, like those on the steel products, which pay 45 per cent. on the value declared. The best proof of it is your own report in *The Iron Age* of December, 1887, as follows: "At the port of New York during the past fiscal year there were 14,050 invoices upon which additions were made by importers, and 17,805 invoices were advanced by appraiser. The amount of such advances upon the principal articles subject to ad valorem duties was \$2,658,306." Is it reasonable to say that New York importers of the principal articles subject to ad valorem duties defrauded your Custom House 31,855 times? Not at all, but it is a proof that your system of ad valorem duties is quite defective.

I request you to publish the present letter in the next number of *The Iron Age* with the same paging and the same text which you used against me in yours of July 5. ANDRIS-JOCHAMS.

[We make room for the letter of our correspondent, although it does not touch the questions at issue. We may state, however, that he is in error when he asserts that steel blooms, or any other forms of steel upon which there is a duty of 45 per cent. ad valorem, are usually bought with the proviso that the risk of duties is for account of buyer. Excluding exceptional circumstances, foreign steel is sold at a fixed price, the importer taking the entire risk.—EDITOR.]

The Duty on Tin Plates.

PITTSBURGH, PA., August 14, 1888.

To the Editor: Although I well remember the advice you gave me some six years ago, when you had for awhile the kindness to publish my correspondence relating to the tin and terne plate industry, I now take the liberty to once more request you to allow me to say something on this subject to your readers. I am induced to do this by the urgent solicitation of many friends.

Your advice at the time mentioned was that inasmuch as the tin-plate question had been reviewed in all its phases it did not appear necessary to continue an elaborate discussion of the subject, and as your admirable invention of a table of quality classification seemed to remedy to some extent the most serious evils from which workers in tin and terne plates were then suffering, I heeded your advice and kept quiet on that "hobby of mine," as some of our correspondents were pleased to

call it, to see what effect your plans and suggestions would have; but in the meantime I have not kept my eyes closed, but have made use of the opportunities which have presented themselves to me to make some personal observations and investigations regarding the tin and terne plate industry in England and Germany as well as in America.

And now, when after the lapse of six years the same complaints as before (pinholes, unreliable coating and tenacity, &c.) are heard, and when our company almost daily receive inquiries whether we cannot furnish such plates as we used to in years gone by, and we still continually furnish iron and soft steel sheets to customers who have tinning establishments of their own, to be used in the manufacture of such tinned goods as they must sell under guarantee, I believe a rehearsal of what was said in those times will not be without interest to your readers.

In that editorial you allude to the suggestion that the sheet-iron manufacturers (they being the most interested parties) should demonstrate the feasibility of manufacturing tin and terne plates in this country at their own expense. Now, Mr. Editor, do you really think that is fair, when you can certainly find by referring to your own columns that such demonstration has been made over and over?

You have published in the long ago a whole series of testimonials to the good qualities of tin and terne plates made in this country; you have published comparative items of cost in Wales and here, and a great deal more information can be found in the records of Congress, and now to demand, after all that has been said and demonstrated, to do this thing over again is, in my opinion, not fair. In 1873 three companies, induced by the then very high prices of imported tin and terne plates, and under the mistaken belief that the law which provided that "tin plates, or iron coated or galvanized with any other metal, should pay duty at 2½ cents per pound" was justly enforced, started tin-plate works, and for a while operated successfully, until English manufacturers, having become alarmed, reduced, and, under an erroneous Treasury Department decision, were enabled to reduce the prices to such a figure that our home manufacturers were forced out of the market.

Yet to-day, while the prices of tin and terne plates have ruled comparatively low since then, there is still left a nice little profit for the English manufacturers, their carriers and middlemen, which amounts to just about the additional duty we ask for. I have compiled and before me now a table comparing the cost at which tin plates can be manufactured with the established prices of labor in Wales and in Pennsylvania. The calculation is based on a box of 1C, 14 x 20, of medium charcoal quality, such as are being quoted at from \$5.25 to \$5.50 per box in New York, and the totals show that such plates can be produced at prices for labor paid in South Wales at \$3.37; at prices paid for labor in Pittsburgh, Pa., at \$5.25. Allow the manufacturers in either place a margin for profit and risks of 8 per cent, and the comparison will show \$3.63 for Wales to \$5.67 for Pittsburgh, and then allow the home manufacturer another small margin for the incidents and accidents which accompany the establishment of any new enterprise, and for the possibility that the foreigners may be able to find means to further reduce their cost, and our demand for a duty of 2½ cents per pound will not appear unreasonable. I could give you this table for publication, but in the first place it is a very long one, and, second, it goes against my sense of business methods to publish the detailed items of cost of any article, because the majority of the readers are not supposed to understand these de-

tails; and it would necessitate such a long explanation that it would require a whole book to make it. However, the figures are open to any investigating committee of legislators or economists who will be willing to listen to explanations.

Of course I realize that likely my assertions will be denied or misconstrued by interested opponents (to them it is useless to talk), but to those who are in honest doubt in regard to the most expedient course to be pursued in this matter, and especially to your correspondent, Mr. Wilkins Trick, who coincides with your views, that the sheet-iron manufacturers ought to put up the money to demonstrate the necessity of increased tariff, I would put the question whether Mr. Wilkins Trick himself has not demonstrated this point with his and his friends' money; for he certainly would not have quit making tin plates at his establishment at Hubbard, Ohio, if he had found that such was profitable under existing circumstances.

We gave Mr. Trick our sad experience before he started, and we told him that an advance of from 25 to 50 per cent. over the wages paid in Wales would not make adequate wages for American iron workers, and that he had to calculate on at least 100 per cent. to be safe, but he thought he knew better and did not profit by the experience we had gained about seven or eight years before him. Now, if four firms have demonstrated that tin plates and terne plates can be made in this country satisfactorily, as far as quality is concerned, but have also demonstrated that, for want of protection, the foreign manufacturers are in the position to sell at our cost, or from 2 to 3 per cent. below it, they reaping at same time a profit of from 15 to 20 per cent. on their sales, and when Mr. Trick, as well as ourselves and several other American citizens, can produce convincing facts and figures to our legislators, why should the sheet-iron manufacturers, or some of them, put up the money, simply to suffer this *British monopoly* to be continued on our shores? Business is not carried on for the sake of pure philanthropy. When we, and likely any other manufacturers, go into the business of manufacturing tin and terne plates again we will do so with the prospect and intention of establishing a business which will be remunerative to ourselves as well as bring prosperity and wealth to the community and the country we live in. I do not only deem it preposterous to ask a few individuals to sacrifice their earnings, but think it is the solemn duty of our government to thoroughly investigate this question and to foster the industry.

As citizens of a free country, where equity and justice are, or ought to be, the first principle of government, we ask for equity and justice to American capital and labor. Grant us this and this only, and with American ingenuity and skill we will defy the world. The very fact that the tin-plate industry has not been granted protection, in harmony with the prevailing policy of the American people, has become a matter of ridicule and contempt on the other side of the ocean, and yet some hidden influences have so far always induced our legislators to legislate in favor of a foreign tin-plate industry rather than for an American one. This is certainly the time to ask for a change, and we do not call upon Jupiter to pull us out of a hole as Mr. Trick pleases to term it, but we shall and do call upon a power in which we have more faith than in Jupiter, and that is the vote of the American people.

But let me give yet a few figures showing how a law protecting the American tin and terne plate industry by a duty of 2½ cents per pound would operate. As said above, with the rate of English wages a box of tin plates can be produced at \$3.37; the average selling price in New

York is \$5.37, showing a margin of \$2 per box; \$1.05 of this goes into the Treasury of the United States; 95 cents go to foreign producers and their agents. The consumption in the United States of foreign-made tin plates has now grown to about 6,500,000 boxes, consequently we pay to foreigners an annual and actual tax of \$6,275,000.

Give us the rate of duty of 2½ cents per pound, or \$2.30 per box of 105 pounds, and the American manufacturer will be able to obtain about \$5.67 per box, which price would include his cost and a margin of .8 per cent. I will admit that this is about 30 cents per box more than the present selling price; but can anybody guarantee that if legislation were adverse to us, and all possibility of an American tin-plate industry were removed, the foreign manufacturers would not increase their prices to the same extent and more? They certainly did get much more than present prices from us before. But take the 30 cents per box and add it to the aggregate we now pay foreigners and you will have \$8,225,000—but this amount is not sent out of the country, but remains right here in the United States family as it were—and I would ask any farmers, mechanics or professional men whether they would not rather pay a member of their family, for whom they have to provide a living any way, \$8 for a certain amount of work than to have the same work performed by an outsider for \$6 while the member of the family is kept in idleness? But then, further, not only this difference between English cost and American selling prices would remain in the country, but the \$22,000,000 of the English cost also—keeping in circulation at home a total of \$30,000,000 annually, which, occupied in turning the ore, coal, limestone, &c., in our hills into merchandise, and in carrying and transporting the same over the country, would actively keep employed over 100,000 people; and these in turn would give employment to another large number of farmers, butchers, grocers, tailors, shoemakers, builders, &c., to keep them in provisions, meat, clothing, shoes, &c.; the latter again would be consumers of the products of our industries; and so it would go on, *ad infinitum*, until a city of the size of Pittsburgh would hardly be large enough to hold all the people who had thus been provided with honorable, decent means of living. I could go on demonstrating further, but presume this is enough for to-day. With your permission I will address you some other time.

Yours respectfully,

W. C. CRONMEYER, Chairman,
U. S. Iron and Tin Plate Co., Limited.

Gatling's Cast Steel Gun.—Dr. Gatling has invented a new steel gun which he claims will be far superior to the built-up gun, and can be made at half the cost. Speaking more definitely, he says: "My patents consist of making guns cast from the highest grade of steel to shape around a central core. This central core is utilized for the purpose of cooling the casting from the interior while the exterior is still hot. The cooling process thus begins from the interior and works out, directly the reverse of the ordinary way. This is one of my central ideas, and the results are of the greatest importance. The metal is forced, as it were, from the interior outwardly, thereby avoiding the creation of a hard, resisting arch on the exterior of the casting, at which point the full intensity of the high power force exercised by the exploding ingredients within the gun exerts itself. It makes the interior of the gun, where the greatest strain is felt, the toughest and hardest part, and the soft and spongiest part the exterior, which thus acts somewhat after the manner of a cushion.

This is directly the reverse of the old style guns, in which the spongiest part is on the interior. This defect cannot be remedied in a gun made by boring a solid steel ingot, for there, although the very softest portion is bored out, still the hard resisting arch is on the outside, which becomes gradually softer toward the interior. Another important point is the method in which the metal is cast. A revolving motion is given it which makes the grain spiral."

Washington News.

(From Our Regular Correspondent.)

WASHINGTON, D. C., August 21, 1888.

The Senate Sub-Committee on Finance did not bring their bill before the general committee to-day, nor do they intend to for awhile. It will not be reported to the Senate until all the business pending there has been disposed of. It has come to their attention that the President is waiting for their bill, in order to make some references to it in his letter of acceptance of the St. Louis nomination. As there is no immediate urgency in getting the bill before the Senate, the committee have decided not to be in haste.

A deputation consisting of E. P. Williams, U. S. Tin Plate Company; Alfred Marshall, of Marshall Brothers; and Charles Gilpin, appeared before the Senate Committee to-day in favor of placing a duty on tin plate which will be protective. The importations last year, it was shown, footed upward of 300,000,000 pounds, and this year the amount will be greater. It was shown that this would consume a certain amount of pig iron, in the elementary processes and sheet iron in the advanced stages, and give employment to fully 30,000 more workers. They showed that free trade would not reduce prices, but in time would increase it, and cited block tin, which is free and controlled by the Dutch, as having increased within a short time fully 100 per cent. in price. They also showed that there was outrageous evasion of duty. Sheet iron with a thin coating of tin is now brought in as tin plate, which was never contemplated in the law. The deputation made a good impression, and their arguments found an appreciative audience. Whether the committee, in the face of an election, will be prepared to reduce revenue by increasing the duties, which is the only effective way short of free list of reaching that result, remains to be seen. The Randall bill adopted this course, putting the duty on tin plate at 2 cents a pound. The Mills bill made it free. It is now the Senate committee's turn to say what they will do.

TARIFF REVISION IN SWEDEN.

The people of Sweden have been having a campaign on protection, and have succeeded in getting into power in the Swedish Diet. They have made many radical changes in the customs duties of the kingdom, and have fairly embarked on a protection line. On July 1, 1888, the new revised tariff went into operation.

The rates are given in kroner, 1 kroner being equal to \$0.268, and öre, 100 öre making 1 kroner. The following are the articles in the schedule of metals upon which the duty has been increased, giving the old and new rates on the same articles:

	Old rate. Kroner.	New rate. Kroner.
Iron and steel, pig and cast, per 100 kg.....	2.00
Iron beam, angle, &c., weighing less than 20 kg. per meter, per 100 kg.....	2.50
Iron rolled and wrought bar, &c., per 100 kg.....	2.50
Iron railroad fish-plates, bolts and spikes, per 100 kg.....	6.00
Iron plate, roller or wrought, of 3 mm. or over thick, per 100 kg.....	3.00
Iron plate, roller or wrought, of less than 3 mm. thick, per 100 kg.....	4.00

Iron plate, roller or wrought, ground, polished or galvanized, per 100 kg.....	6.00
Iron anchors, &c., per 100 kg.....	4.00
Iron chains, 25 mm. or over in diameter, per 100 kg.....	3.50
Iron chains, 6 to 25 mm. in diameter, per 100 kg.....	7.00
Iron spikes and nails, 45 mm. or over in diameter, per kilogram.....	0.03
Iron screws, 75 mm. or over in diameter, per kilogram.....	0.20
Iron screws, less than 75 mm. in diameter, per kilogram.....	0.30
Iron railroad materials not specified, per 100 kroner.....	10.00
Wire, iron and steel, 1½ mm. and over thick, per kilogram.....	0.04
Wire, iron and steel, less than 1½ mm. thick, per kilogram.....	0.08

THE SWISS PATENT LAW.

The Republic of Switzerland has passed a law for the protection of inventions, thus following in the wake of other nations. The final disposition of the question, however, as to whether the law shall be operative or not, will first require the petitions of 30,000 voters asking its submission to the people. That point gained, the law must then be submitted to a vote and be approved by a majority. It is not stated whether the Swiss Government has a patent on this method of giving a law force. It will take three months to carry out this rigmarole. Material objects and not processes are protected. It is said that "this feature is due to the efforts of the manufacturers of aniline colors and chemicals, whose interests would be injuriously affected by a law as comprehensive as that of the United States, which protects 'useful arts' and 'compositions of matter,' as well as tools and machines."

The Chartiers Valley Gas Company.

In a very interesting report by George E. Mann, city engineer of Buffalo, growing out of the natural gas explosion in St. Paul's Church, in that city, an account is given of a visit to the Chartiers Valley Gas Company, of Pittsburgh. At the wells the connection with the main line is made in the following manner: The casing that is put in the well at the time of drilling to wall out water from the rock seams extends up to the derrick floor, a branch is bolted to this casing, having one of its outlets pointing straight up the derrick and the other going off at the side at an angle of 45°. Upon each of these outlets, which are 6 inches in diameter, a gate valve is bolted, the gate valve on the upright branch having a pipe bolted to it to conduct the gas to the top of the derrick in case it is necessary to blow off the gas. From the valve on the branch pipe a curved pipe is bolted, which leads into a tank placed near the well to separate and collect any water or oil that may be carried along with the gas as it leaves the well. A safety valve is placed on top of the tank. All the fittings used about the wells are enormously heavy, so as to withstand the great pressure of the well when shut in. The first line laid was 8 inches in diameter, wrought iron screwed joints. In 1885 a second 8-inch line was laid from the Murrysville field, a line 6 inches larger than any line laid from any gas field. The following season this company laid a 12-inch wrought pipe line from the new Glenfield gas field. These three different gas fields are in different directions from Pittsburgh and Allegheny City and about equidistant, being about 16 miles. The largest line in the world for conveying natural gas was laid by this company and finished last October. It runs from the northern Murrysville gas field to Pittsburgh, a distance of about 20 miles. The first 8 miles, beginning at the wells, is 16 inches in diameter. It is then increased to 20 inches for a distance of 6 miles; at the end of the 20-inch a 24-inch begins, and extends 5 miles through the city. The pipes are, excepting the 24-inch, of wrought iron, 1½

welded seams and converse patent joints, the largest lap welded pipe ever made.

The Chartiers company have a total of 479,258 feet of high pressure lines. As the gaspasses through the city it enters regulating stations, where the pressure is reduced, a higher pressure being carried on the lines from the wells to the city than within the city. From 15 to 20 pounds per square inch is the pressure within the city on the so-called mill supply line. It is located principally along the Allegheny River near the shore, where all the large mills are located. It crosses the Monongahela river by six 10-inch lines, and is connected into the South Side mill supply system; on this side of the river are also reducing stations; the total number of feet of high pressure or mill supply lines in Pittsburgh and Allegheny owned and operated by this company is 148,693. These lines are ventilated with what is known as the "patent separate pipe escape system." It consists in placing a sleeve over every joint in the gas line; this sleeve is made perfectly gas tight around the pipe by means of lead or other suitable materials; on the inside of the sleeve a space or chamber is left where all the gas that escapes from the joint is collected; connected with this chamber at the top a small pipe leads off and up to a lamp-post at the curb line. The escape-pipe that leads away from the joint is marked with a corresponding number at the top of the lamp-post, so if gas is discovered escaping, by noting the number of the small pipe through which it escapes the exact location of the leak can be determined, as each joint in the main line is numbered, and its exact distance measured from the lamp-post. In addition to the above system the top of the pipes are covered with broken stone to a height of 9 inches also on the branch lines to the lamp-posts. Over the broken stone is laid a sheet of tar paper, and the earth filled in on top. by this means if any gas should escape from defective joints or the body of the pipe, it will follow this blind drain and up the lamp-post to the open air.

The house supply system of this company is the same as in operation here in Buffalo—that is, large mains and low pressure rather than high pressure and small mains. On this point Mr. Hartupsee says: The Chartiers company lay pipes to supply the private houses so large that a pressure of 4 or 5 ounces only need be and is carried in them. The service-pipes are then run direct into the consumer's house, no regulating or other device being necessary, as the pipes themselves carry no greater pressure than is required in the houses. The question may be asked, "Are not the valves that control the pressure between the mill and the house supply lines liable to get out of order and let a higher pressure into the house than would be safe?" We answer, "Yes, but of these valves there are in the two cities but eight, and perhaps will be never more than 12, and to watch them the company keep watchmen night and day, whose duty it is to see that these valves are always in order. In the Buffalo system there is attached to these valves a safety device on the principle of a gasometer, further mention of which is made in this report.

"Now, in the first system there are valves designed for the same purpose used between the mill and the house-supplying lines which we grant can be kept in order, the same as our company keep theirs; but in addition to this there are thousands of these same kind of valves scattered in cellars and out-of-the-way corners all over the two cities, and few persons would say that these thousands of valves can be examined every day as they should be to be certain that they will work when called upon. Our company have 20 miles of house-supply lines in the city of Pitts-

burgh and eight miles in Allegheny. We have over 100 miles of private wire for telephone and telegraph service, besides being connected by means of the central telegraph station to various other stations belonging to the company in the two cities. Watchmen are stationed along the lines night and day. At each of the stations gauges are connected with the line and the pressure at all stations is sent to the main city office every hour and from this office the pressures are regulated."

Definition of the Contract Labor Law.

The Secretary of the Treasury has sent a communication to the Secretary of District Assembly No. 46, K. of L., Buffalo, N. Y., in which he defines the effect of the act on aliens residing in adjoining foreign territory, and under what circumstances prohibited from entering the United States. The communication says: "In answer to your letter, propounding certain questions relative to alien laborers, you are informed that, under the provisions of the act of February 23, 1887, prohibiting the importation of foreign laborers under contract, it is not necessary that the contract be in writing, signed by the parties, to render the person hiring or engaging such laborers liable to the penalty provided in section 3 of the act. An oral contract is sufficient, or, as expressed in the act, any 'contract or agreement, parol or special, express or implied, made previous to the importation or migration of such alien,' &c. By reference to the letter of the acting secretary of May 16, 1887, on the same subject, addressed to the Hon. John B. Webber, cited in your letter, you will observe that you are mistaken in regard to what is there stated as to the kind of contract forbidden by the act.

"Section 1 of the act referred to makes it unlawful for any person, company, partnership, or corporation in any manner to prepay the transportation, or in any way assist or encourage the importation or migration of aliens into the United States, under any contract or agreement made previous to the importation or migration of such aliens.

"If the circumstances under which an alien laborer enters this country are such as would lead the courts to find that there was an implied contract between him and his employer previous to his entry, a case would seem to be presented of a violation of the provisions of the act, which would not be affected by the retention of his residence in the foreign country and his daily return to his home. And if an alien residing in adjoining foreign territory and retaining his residence there enters this country without having previously made any contract to labor here, and after such entry contracts to labor, and while such contract is in force returns to his home in the foreign country and again enters for the purpose of performing the contract and pursuant to its terms, the latter entry, being under a contract previously made to perform labor in this country, would seem to be prohibited."

Riehle Bros., proprietors of the Machine and Testing Machine Works, Philadelphia, have secured the services of the new firm of the Robert W. Hunt & Co. Bureau of Inspection, Nos. 631 and 633 "The Rookery," Chicago, to represent them in the testing machine branch of their business in the Northwest.

The Reading Railroad Company want the City of Philadelphia to pay \$3,000,000 toward defraying the costs of the proposed terminal improvements in that city, which have for their principal feature the raising of the tracks, thus doing away with grade crossings.

Triple-Expansion Engine Cylinders.

The proportions of cylinders of triple-expansion engines adopted by different builders vary very considerably. The variation is greater even than that which obtained generally with the compound marine engine. The proper proportions of the cylinders depend to a considerable extent on the total ratio of expansion adopted, and the latter depends on the steam pressure employed. It is interesting to note the very wide discrepancy in the dimensions of cylinders adopted for the same boiler pressure by various English builders. In one instance a Clyde, Scotland, firm, working with a 150-pound boiler pressure, use a ratio of low-pressure cylinder to high-pressure of 6.7; while a firm in Hull, for the same pressure, adopt in one case a ratio of 8, and in others 6.2 to 6.8. In the case of the steamship Aberdeen the boiler pressure is 115 pounds, and the ratio of high-pressure cylinder to low-pressure cylinder is 5.4. With 140-pound boiler pressure, one eminent firm adopts a ratio of 6.1, and another, with boiler pressure of 135 pounds, makes the ratio of 6.4. Of course some variation in practice is to be expected, but they cannot all be right. In working out the powers of the triple-expansion engines theoretically, practice seems to point to about 15 pounds absolute as the best terminal pressure to assume. The absolute initial pressure divided by that number gives the best ratio of expansion to adopt under most circumstances. With such data the average mean pressure referred to low-pressure cylinder approximates to about one-fifth of the boiler pressure in practice. From this data it is easy to arrive approximately at the diameter of low-pressure cylinder required for a given horse-power and boiler pressure. The size of this cylinder does not give rise to much variation in practice. The diameters, however, of the high-pressure and intermediate cylinders vary considerably according to the opinion of various engineers. With the three-crank engine the object should be to obtain as nearly as possible equality of power and stresses in the three cylinders, with equality in the ranges of temperature. As with the compound engine, so with the proportioning of triple expansion engines—some builders exhibit a good deal of rule-of-thumb work, which does not indicate that they have rationally solved the problem of what they turn out in practice. The best ratios, however, and something like uniformity of practice under similar conditions should be sought for.

A Prosperous Copper Mine.—The advance official summary of the Tamarack Mining Company, for the fiscal year ended June 30, is at hand, and shows remarkable progress in 12 months. When the second shaft is completed, another great stride forward will be in order. The statistics for the year compare as under with the previous year:

	1887-88.	1886-87.	Increase
Product, mineral, lb. 13,007,234	6,282,119	7,375,115	
Per cent. fine copper	78.36	74.40	1.96
Product fine copper, lb.	10,389,867	5,539,521	5,750,346
Gross receipts	\$1,448,944	\$474,615	\$974,329
Expenses	567,259	380,582	218,657
Profit	881,705	94,032	787,673
Profit per lb.	8.058c.	2.04c.	6.018c.
Construction	\$150,886	\$194,187	\$43,301
Dividends	120,000		120,000
Balance assets	606,164	25,445	580,719
* Decrease.			

The cost of mining in the last year was 3.97 cents, the cost of copper delivered in New York was 5.75 cents per pound; price received, 13.86 cents per pound. For April, 1888, the cost per pound at New York was 6.60 cents, and in December, 1887, it was 5.03 cents. The price received ranged from 10.71 cents in July, 1887, to 16.21 cents in February, 1888.

Foreign Markets.

EQUIVALENTS

Franc, Peseta or Lira.....	Cents.
Florin (Netherlands).....	10.3
Florin (Austria).....	40.2
Milreis (Portugal).....	35.9
Milreis (Brazil).....	\$1.08
Mark (Germany).....	54.6
.....	23.8
Kilogram.....	Pounds.
Picul.....	220.5
.....	134.

WEST INDIES.

PORT OF SPAIN, TRINIDAD, July 20, 1888.—*Asphaltum*.—Our market has been moderately active and steady at \$14.04 $\frac{3}{4}$ ton Boiled, and \$6.84, Crude, on the dock, including the export duty. Since January 1 there have been shipped 33,000 tons, against 21,859 last year, and 17,839 in 1886. *Exchange*, 90 days' sight on London, may be quoted \$4.77 @ \$4.83.—*E. P. Masson*

ARGENTINE REPUBLIC.

BUENOS AYRES, Aug. 2, 1888.—*Iron and Steel*.—An Iron and Steel works have been founded in this city with a capital of \$300,000, which have bought out the works of Vader & Pena, and will continue and extend the latter.—*Per cable via Europe.*

AUSTRALIA.

MELBOURNE, VICTORIA, July 26, 1888.—*Iron*.—Sales have been satisfactory in all branches; prices are nevertheless firm. Galvanized Iron is bringing without difficulty £16, 10/, however, and Fence Wire £9, 15/. Scotch Pig Iron, Clyde No. 1, is selling at £5. *Tin*.—During the fortnight Tin shipments from the Continent and Tasmania amounted to 225 tons.—*Per cable via Europe.*

RUSSIA.

ST. PETERSBURG, August 10, 1888.—*Petroleum*.—As per circular of Messrs. Burkhart & Co., Batoum, the following shipments of Petroleum, lubricating Oil and residue were made to Europe, India, the Straits, China and Japan during the first six months per steamer:

In Tank Steamers to Europe.

	Steam- ers.	Crude Oil. Pud.	Refined. Pud.
To England.....	12	1,532,740	.....
To Germany.....	4	255,584	192,574
To Austria.....	20	582,553	1,459,236
To Italy.....	4	432,455	.....
To Belgium.....	7	471,086	.....
To Russia.....	8	757,300	.....
To France.....	1	.....	.....

Total..... 56 4,031,778 1,651,810

	Residue. Pud.	Machine Oil. Pud.	Cylinder Oil. Pud.
To England.....	.....	.....	.....
To Germany.....	.....	.....	.....
To Austria.....	145,634	.....	.....
To Italy.....	.....	.....	.....
To Belgium.....	206,198	44,895	.....
To Russia.....	.....	.....	.....
To France.....	42,234	28,900	14,955

Total..... 494,066 73,795 14,955

To Asiatic Countries.

	Re'd Petro- leum. ers.	Weight- ing in Cases.	Pud.
To British India.....	16	1,176,980	2,353,960
To the Straits Settle- ments.....	3	190,693	281,386
To Japan.....	3	190,525	281,050
To China.....	3	190,666	281,336

Total..... 25 1,748,864 3,197,732

The Pud weighs 36 $\frac{3}{4}$ lb American.—*Journal de St. Petersburg.*

EAST INDIES.

PENANG, July 7, 1888.—*Tin*.—Receipts since the 22d ult. reached 8000 piculs, of which Europeans took 3000 and Chinese 4000. Prices for Larut Tin opened at \$30.40 $\frac{3}{4}$ picul and rose to \$30.55, while Europeans began to procure other sorts, which caused a decline in the former to \$29.31 to recover to \$33.40, at which Chinamen remain buyers. Europeans confine their buying to Larut Tin. Receipts from the interior remain moderate.—*Schmidt, Kustermann & Co.*

MANILA, August 13, 1888.—*Hemp*.—There are buyers at \$10.12 $\frac{1}{2}$, against \$9.87 $\frac{1}{2}$ $\frac{3}{4}$ picul same date last year, equaling respectively £53. 10/ and £53. 4/6 $\frac{3}{4}$ ton, cost and freight. There have been no clearances for the United States during the week, whereas last year 5000 bales were cleared; since January 1 they amount to 99,000 bales, against 138,000 last year, while there are loading 10,000, against 16,000. The clearances for England since January 1 have been 221,000, against 137,000, and there remain loading for the same destination 12,000, against 8000. Cleared for all other ports, 46,000, against 26,000; receipts at all ports since last cable, 17,000, against 4000; do, since January 1, 363,000 bales, against 287,000

last year and 241,000 in 1886. *Freight*, \$6, against \$6. *Exchange*, 3/5 @ 3/5 $\frac{3}{4}$. *Silver Coinage*.—At a meeting of Spanish and other merchants it was resolved to petition the home Government, in view of the depressed rates of exchange, to cause Silver dollars to be coined for circulation in this colony, of the fineness of 9/10, and thenceforward treat Mexican dollars merely as if they were Bar Silver.—*Ker & Co. to Charles Nordhaus, New York, per cable direct.*

SPAIN.

BILBAO, July 21, 1888.—*Iron Ore*.—Since the 21st ult. only a few single cargoes have been taken for export at 6/10 @ 7/3, Rubios, and 7/6 @ 8/, Campanil, the shipments amounting to 72,943 tons the first week, and to 67,774 the last week. The total shipments since January sum up 2,276,674 tons, against 2,676,033 tons same time last year. *Pig Iron*.—The export has during the fortnight not exceeded 300 tons, while coastwise 1607 tons have left our harbor. To-day's quotations for Pig Iron f.o.b. $\frac{3}{4}$ ton here are 60 pesetas or francs. Spot, Nos. 1 to 3, and 57, Nos. 4 to 6; Futures may be quoted 58 and 55 respectively; Lingotillo at Huelva or Seville, 65.—*Bilbao Marítimo y Comercial.*

GERMANY.

HAMBURG, August 4, 1888.—*Iron*.—The Pig Iron market is as dull as ever, including Spiegel, which remains 56 marks $\frac{3}{4}$ ton, 10 to 12 $\frac{3}{4}$, without an export demand. Forge Pig is depressed; at Siegen it is selling for 47 @ 48; orders reach to the middle of October. Luxemburg may be quoted 38.70 @ 40 marks. All other Pig remains quiet and unaltered. Finished Iron has become slightly livelier for Domestic, but the export is positively extinct. Machine shops, foundries and car manufacturers are all doing well in Rhenish-Westphalia. Bessemer Steel Billets are quoted 135; Wire Rods, 120 @ 121; Steel Rails, 115 @ 120. After English Rail-makers shall have agreed, the negotiations for a renewal of the International Steel Rail syndicate may be resumed. Frederick Krupp, of Essen, sold the Andalusian railroads 14,000 tons at 113 francs laid down at Cadiz, while the French St. Chamond Steel Works asked 126 francs. While the outlook in the Iron trade in Westphalia is anything but encouraging just at present, Upper Silesia has no fault for complaint, even in the Wire branch it has not. Export of Iron, Hardware and Machinery from Germany the first six months:

	1888. 100 kg. net.	1887. 100 kg. net.
Scrap Iron, Pig, Billets, Old Rails and Ingots..	876,426	1,758,101
Hardware.....	4,178,485	4,844,053
Machinery.....	308,390	356,487

Total..... 5,453,310 6,959,193

Import: 1888. 1887.
100 kg. net.

Scrap Iron, Pig, Billets, Old Rails and Ingots..	891,305	676,108
Hardware.....	215,847	233,396
Machinery.....	193,507	146,248

Total..... 1,300,659 1,055,722

NEW PUBLICATIONS.

THE CHEMICAL ANALYSIS OF IRON.—By Andrew Alexander Blair. J. B. Lippincott & Co., Philadelphia. Price, \$4.

Mr. Blair is too well known as a metallurgical chemist and as one of the leading contributors to the literature of his particular branch of science to need an introduction to the iron trade. His summary of methods published in connection with his work on the Tenth Census will be particularly remembered. Since then an army of progressive young men have been busy in our chemical laboratories, steadily perfecting and simplifying methods. It is their work as well as his own that Mr. Blair has gathered in a comprehensive treatise, which will prove invaluable to the beginner and will be of much service to even the most experienced. Naturally the bulk of the work is descriptive of Mr. Blair's own practice, supplemented by assistance and suggestion from some of our leading iron works' chemists, and by a critical study of the mass of scattered literature in which others have put their experiences on record. The work is thorough, without being too elementary. It is naturally subdivided into one part which deals with apparatus and reagents, a second descriptive of the methods used in the analysis of pig iron, bar iron and steel, taking up necessarily

sulphur, silicon, slag and oxides, manganese, carbon, titanium, copper, nickel, cobalt, chromium, aluminium, arsenic, antimony, tin, tungsten and vanadium. The third part deals with the analysis of iron ores and the fourth with the analytical work connected with the materials of the stackhouse and the analysis of gases. Mr. Blair's is a standard work which will prove the chief guide of the young chemist and a frequent guide to more experienced analysts. There is one suggestion which we would like to make, since we believe that it would be prized by beginners, and that is a more frequent statement as to the time which different methods require in the hands of a skilled analyst. Mr. Blair refers to this point repeatedly, but we know how much aid it is to a beginner to be able to check his progress in this respect by that of his seniors, especially when he is located where personal conferences with them are out of the question.

TREATISE ON PATENT ESTATE.—By Thomas B. Hall. Published by Ingraham, Clarke & Co., Cleveland, Ohio. 12 mo. Law binding. Price, \$3.

Mr. Hall's work grew out of the accumulation of notes, made for personal use, on features of the patent law which have remained comparatively undeveloped. In a series of chapters Mr. Hall deals with the objects of our patent system, with their property right and its profits, and their partition. He takes up the questions arising from the accounts between part owners, the infringement between part owners and the limitations of sectional grants. After quoting the cases, Mr. Hall ends his chapters with a brief summary of conclusions. An appendix gives a number of leading opinions not in technical patent reports. Although written strictly from the standpoint of a lawyer, manufacturers, inventors and business men will find a study of the work valuable, and reference to it will guide in determining questions often perplexing to these not versed in law.

STEAM HEATING. An Exposition of the American Practice of Warming Buildings by Steam. By Robert Briggs, M. I., C. E. 122 pages. Size 4 x 6 inches. Published by L. Van Nostrand. Price 50 cents.

The valuable little book before us is numbered 68 in the Van Nostrand Scientific Series, and this much description will, in a general way, inform our readers what the volume is like so far as appearance is concerned. The part by Mr. Briggs occupies 70 pages of the book, the remainder, or addendum, being written by Alfred R. Wolff, M. E., and contains some empirical data on steam heating. The steam-heating portion is reprinted from the "Proceedings of the Institute of Civil Engineers," and was prepared, presumably, for the purpose of informing English readers concerning the practice of steam heating in this country. The article opens with a brief historical review of the practice, after which some 20 odd pages are devoted to wrought-iron welded tubes and couplings, the subject being fully treated with the aid of tables and formulæ. The subject of boilers is very briefly noticed and treated only in a general way. The theory of the circulation of steam follows, and some remarks are added on the clothing of steam mains. Steam stop valves are illustrated and described and the remainder of Mr. Briggs' work is devoted to radiators, their use and construction. The appendix by Mr. Wolff contains data in the shape of tables and formulæ that will prove of special interest to those who investigate the subject of steam heating from a theoretical standpoint and who are not afraid to handle mathematics. A table at the end giving chimney and boiler proportions, which was prepared by Mr. William Kent, possesses considerable value for those who do large steam-heating jobs.

TRADE REPORT.

Chicago.

Office of *The Iron Age*, 95 and 97 Washington St.,
CHICAGO, August 20, 1888.

Pig Iron.—Business fell off somewhat during the past week, but it has been far from dull. In fact, some furnace agents have found a better demand for their iron than during the previous fortnight. The withdrawal of a number of furnaces from the market in consequence of the sale of their entire product for months to come has given others a better opportunity to secure orders. Buyers being now restricted as to brands, an improved feeling is noticed among sellers and the upward tendency in prices is more decided. Some of the favorite Soft Irons have been marked up 50¢ per ton in the past week, and the others will soon follow, if the present demand continues. The large consumers of Lake Superior Charcoal have not all bought, and heavy transactions are yet to come in this line, which causes prices to be held firmly at the advance made last week. Although some brands of Lake Superior Coke are still available at old figures, sellers of competing brands state that orders are being secured with little difficulty at considerably higher prices. Southern Coke Iron has been freely sold at outside quotations. We quote for cash as follows, f.o.b. Chicago: Lake Superior Charcoal, all numbers \$19 @ \$20; Alabama Car-Wheel, \$26.25; Southern Charcoal Foundry, No. 2, \$18 @ \$19; Jackson County Softeners, No. 1, \$18 @ \$18.50; Hocking Valley, Soft Foundry, No. 1, \$17 @ \$18; American Scotch (Blackband) No. 1, \$18.50 @ \$19.50; other Ohio Scotch Irons, No. 1, \$17.50 @ \$18; Lake Superior Coke, No. 1, \$17 @ \$18; No. 2, \$16 @ \$17; No. 3, \$15 @ \$16; Southern Coke, No. 2, \$17 @ \$17.50; No. 2½ and Open Bright, \$16.50; No. 3, \$15.50 @ \$16.

Bar Iron.—Large orders are still in the market, and the condition of trade continues to improve. So many mills now have all the orders they care to take, and the price of raw material shows such a decided upward tendency, that the mills now in the field are asking higher prices. Manufacturers in the Mahoning Valley are naming 1.57½¢ at mill, half extras, as their bottom rate, and some of them have instructed their agents to take no orders, even at this figure, without first submitting them for approval. Prices for carload lots, at Chicago, range from 1.67½¢ to 1.70¢, half extras. The advance in prices is enabling some mills to secure orders which have for a long time done no business here because of their refusal to meet the low rates prevailing. Jobbers are showing their confidence in the maintenance of the advance which has been established by stocking up quite freely. They quote 1.80¢ @ 2¢ from store, according to quantity and quality.

Structural Iron.—Bridge material has been in much better demand than for some time, and manufacturers are advancing prices. Mill lots are quoted as follows, f.o.b. Chicago: Angles and Universal Plates, 2.30¢; Tees, 2.45¢; Beams, 3.40¢. Store quotations are held at 2.40¢ @ 2.70¢ for Angles; 2.60¢ @ 2.90¢ for Tees; 3.80¢ for Beams and Channels.

Plates, Tubes, &c.—No large transactions are reported in Plates, but a brisk trade has been done in the usual store lots. The mills have advanced their prices for Tank Iron, but dealers here have not changed the store quotations, although they will be obliged to do so when present contracts expire if the advance by the

mills is maintained. Tubes are firmer: Store prices are as follows: Heavy Sheets, Nos. 10 to 14, 2.65¢; Tank Iron, 2.55¢; Tank Steel, 2.80¢; Shell Iron, 3¢; Shell Steel, 3.25¢; Flange Iron and Steel, 4¢; Fire-Box Steel, 4.75¢ @ 5.75¢; Boiler Rivets, 4¢ @ 4.25¢; Ulster Iron, 3.75¢; Boiler Tubes, 60 % and 10 % off on 2½-inch and larger and 62½ % off on 2-inch and smaller

Sheet Iron.—The condition of this branch of trade continues as reported last week, much inconvenience being experienced among jobbers who are unable to get the Sheet Iron for which they have placed contracts. The few mills which are not fully sold up are profiting by this state of affairs, having found numerous buyers willing to pay from 3¢ to 3.05¢, f.o.b. Chicago, for No. 27. Jobbers' prices for small lots are 3¢ for No. 24, 3.10¢ for Nos. 25 and 26, and 3.20¢ for No. 27.

Galvanized Iron.—Manufacturers' agents report a very perceptible improvement in the demand, orders being distributed over all classes of consumers. Prices are well maintained, concessions being less frequent than in previous weeks. Small lots continue to be quoted at 60 % and 5 % off for Juniata and 60 % and 10 % off for Charcoal.

Merchant Steel.—Manufacturing consumers have placed large orders during the week. Plow manufacturers have been very liberal purchasers at the prices fixed by the makers of syndicate Steels. Store trade keeps quite active, with probably a little less demand for the highest grades. Quotations from store are as follows: Bessemer Bars, 2.30¢ @ 2.40¢; Tool Steel, 8½¢ @ 9½¢; Specials, 13¢ @ 25¢; Crucible Spring, 4.40¢; Open-Hearth Spring, 2.90¢; Open-Hearth Machinery, 2.75¢ @ 3¢; Crucible Sheet Steel, 7¢ @ 10¢. Good orders for Rake Tooth Steel have been taken at 7½¢ @ 8½¢.

Steel Rails.—Some slight indications of an improvement in business are perceptible, which the manufacturers hope will develop into a more pronounced condition of healthfulness before long. Orders are known to have been placed during the week for round lots of Steel Rails, but the exact quantity and terms have not been disclosed. Inquiries are coming in a little more freely, and the prospects are quite encouraging at present writing. It is true that the North Chicago Rolling Mill Company have shut down their Rail mill for lack of orders, but the stoppage is expected to be of short duration. Quotations are nominally \$31 @ \$31.50, but they will be shaded for desirable orders.

Old Rails and Wheels.—Sales of Old Iron Rails are reported at \$20.50. They are very scarce, however, and inquiries are numerous, and it is probable that no considerable quantity could be had at even \$21. Cleveland parties state that an offer of \$23 has been refused by holders of a stock of Rails at that point. Old Steel Rails are wanted at about \$18.50 for long lengths, free from Frogs, &c. Old Car-Wheels are also scarce, and nominally quoted at \$19 @ \$19.50.

Scrap.—A better movement is noted in this material. Sales of Forge have been made to some extent, but there have been large transactions in Mill. Borings and Turnings are in good demand. For Cast there is some inquiry, but sales are slow. The higher grades of Steel Scrap are moving off, but Mixed Steel is not wanted. Dealers are now offering \$13 @ \$14 for Mixed Country Scrap. Selling quotations for carefully selected are as follows, per ton of 2000 lb: No. 1 Forge or Railroad Shop, \$18 @ \$18.50; Track, \$17 @ \$17.50; No. 1 Mill, \$14.50 @ \$15; Light Wrought,

\$9 @ \$10; Horseshoes, \$18; Axles, \$28; Cast Machinery, \$14; Stove Plate, \$10.50 @ \$11; Cast Borings, \$9; Wrought Turnings, \$10 @ \$11; Axle Turnings, \$12.50 @ \$13; Coil Steel, \$14 @ \$15; Leaf Steel, \$16 @ \$16.50; Locomotive Tires, \$16.50.

Hardware.—Jobbers of Heavy Hardware are having a good demand for their specialties. The stiffening tendency in Iron has imparted a feeling of greater confidence to the trade, and they look forward to a very satisfactory fall season. The proposed combination of manufacturers of all articles entering into the construction of Wagons and Carriages has incited the jobbers to take measures to protect their interests, which are alluded to at length in another part of this issue. The Shelf Hardware trade is in very good shape, and the outlook is improving every day. The usual seasonable goods are moving very freely, while for staple articles a continuously good demand is being experienced. In consequence of the advance in Pig Tin the price of Solder has been marked up 2¢ per lb, to 15¢. As Pig Lead is also dearer the price of Shot has been raised 5¢ per sack, to \$1.30. Collections are light at present, but this is usual in August.

Nails.—At last Nails seem to have touched bottom. Heavy sales have been made by manufacturers' agents to the merchants, who were apparently convinced that lower prices could not be expected. It is stoutly asserted that it is no longer possible to secure Steel Nails at the lowest rates which were current last week. An effort is on foot to make \$1.90, f.o.b. Chicago, the bottom price for large lots from factory. Inquiries are numerous, and appearances now indicate a season of activity for the Nail manufacturers. Small lots are quoted by jobbers at \$2 for Steel Nails and \$2.50 for Wire Nails. A meeting of Western Wire Nail manufacturers will be held at Cleveland to-morrow (21st) to devise some means of improving the condition of that branch of trade.

Barb Wire.—A little improvement is noted in the demand, but prices are unchanged. Jobbers quote 3¢ for Painted and 3.75¢ for Galvanized, in small lots.

Pig Lead.—Continued heavy transactions are reported, purchases made being almost entirely for consumption. The total volume of business for the week is estimated at 900 to 1000 tons at prices ranging from 4.25¢ to 4.32½¢, easing off at the close to 4.30¢, in sympathy with advices of lower prices in the East. Brokers state that a little reaction would not be surprising after so sharp an advance, but they claim that any reaction will only be temporary.

The Ashland Furnace, at Ashland, Wis., went into blast again to-day. It makes the Hinkle brand of Lake Superior Charcoal Iron, for which Rogers, Brown & Co. are agents. Over one-half of its anticipated product for this blast has already been sold.

Charles O. Hale, 34 Wabash avenue, Chicago, has made arrangements to succeed H. F. Lockwood as Western correspondent for Hammond & Lobdell, of New York, in the Tin-Plate and Metal brokerage business. Mr. Hale is not new to the trade, having represented E. S. Wheeler & Co., in Chicago, previous to the failure of that house.

The freight rate on scrap iron from Chicago to Pittsburgh has been reduced to \$2 per ton in consequence of a fight between competing railroads. A week previously the rate was reduced to \$1.85 per ton to Mahoning Valley points for the same reason.

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St.,
PHILADELPHIA, Pa., August 21, 1888.

Pig Iron.—The market is a little quiet, but is not materially different from what it was a week ago. Buyers seem comparatively indifferent in regard to placing orders for forward delivery, however, and the general feeling is that prices are about as high as they are likely to be for some time to come. Business is not what can be called bad, when the week's transactions are averaged up, but there is a lack of buoyancy which is discouraging to those who have been looking for steady improvement. There is no retrogression, however, so far as prices are concerned, although there is some little falling-off in the demand and in view of the expected increase in the output during the later months of the year, consumers are disposed to take their chances rather than place orders at the prices usually demanded for late deliveries. But the offerings are not large, and the current demand for small lots in connection with deliveries on former contracts, entirely prevents anything like accumulation. Hence there is no apparent reason for expecting anything in the market different to what we have had for some weeks past. A good deal will depend probably upon crop prospects, and until they can be fairly estimated it is hard to say in which direction the market will move. Reports from Iron centers West and South are decidedly favorable, and for the present little or no competition is met with from those points. The prospective increase in the output, however, may perhaps again change the current, unless it is offset by increased consumption, which, to say the least, is somewhat doubtful. But as regards this particular market, the feeling is certainly not very buoyant, and it may well be doubted if anything like large lots could be placed without making some concessions in buyers' favor. Good brands, as already stated, are in very moderate supply, but of one kind or another there is a good deal of Iron for sale, and to that extent the position is less favorable than it was two or three weeks ago. Prices remain steady at \$18 @ \$19 at tide for No. 1 Foundry; \$17 @ \$17.50 for No. 2, and \$15.75 @ \$16.25 for Gray Forge. Southern Iron could be had at 50¢ @ \$1 below these figures, but there is no demand for it unless further concessions are offered. Agents are watching their opportunity to secure business, although in the meantime markets elsewhere appear to offer better inducements than those around Philadelphia.

Foreign Iron.—No business transpiring, buyers and sellers being unable to come together. Asking prices are about \$19.50, c.i.f., duty paid, for Bessemer, and \$26 @ \$26.50 for 20 % Spiegel.

Blooms.—Steel Blooms are moderately active, one lot of 10,000 tons of Nail Slabs having been sold by a Pennsylvania mill, besides various sized lots of Billets at about quoted rates, although on large lots special terms have been made. Quotations about as follows: Nail Slabs, \$28.50 @ \$29.50; Billets from \$30 to \$35, f.o.b. cars at mill, according to analysis; Charcoal Blooms, \$52 @ \$54; Run-out Anthracite \$42 @ \$44; Scrap Blooms, \$33 @ \$35 per "bloom" ton of 2464 lb. Foreign at tide, c.i.f., duty paid, \$29 @ \$30 for Nail Slabs; \$31.50 @ \$32.50 for 4 x 4 Billets, and \$35 @ \$39 for Siemens-Martin, price according to analysis, &c.

Muck Bars.—There is a continued good demand, and prices are firmly maintained. Sales chiefly at \$27.50 @ \$28, delivered, holders now being somewhat firm at the outside quotation.

Bar Iron.—There is nothing to indicate any special change in the position, as compared with last week. The demand is fair, some of the mills report plenty of work, while others find it difficult to run more than half or two-thirds time. Prices are unchanged, and so irregular that they are hardly quotable. Some get 1.85¢ @ 1.98¢ for all they sell, while others are anxious for business at 1.75¢ @ 1.8¢. It is possible that there may be all the difference in quality, but large buyers claim that they can secure a perfectly satisfactory article at the inside figure, although for special brands they may have to pay more. The demand is chiefly for small lots, however, and so far as we can learn none of the mills are accumulating orders for more than a very short time ahead. Skelp is in good demand, and is helping some of the mills considerably. Orders are still on the market for good-sized lots, and will probably be taken at about 1.8¢, although some of the mills are trying to get a slight advance on that figure.

Plate and Tank Iron.—The past week has not developed any improvement in this department, although there is a pretty fair demand for small lots. Mills have not much work ahead, however, so that there is a good deal of competition to secure what little business is offered, and prices are kept at the low figures ruling during the early summer months. There is nothing important in sight, and it is to be feared that the present condition of things will continue for some time yet. Prices for small lots about as follows: Ordinary Plate and Tank Iron, 2¢ @ 2.10¢; Shell, 2.4¢ @ 2.5¢; Flange, 3.5¢; Fire-Box, 4¢; Steel Plates, Tank and Ship Plate, 2.3¢ @ 2.4¢; Shell, 2.7¢; Flange, 3¢ @ 3½¢; Fire-Box, 3½¢ @ 4½¢.

Structural Iron.—The market is dull and mills are getting very little new business. Architectural work keeps up fairly, and there is a good deal in the way of finishing up bridge and elevated work, but apart from that the outlook is not encouraging. Prices about as follows: 2¢ @ 2.10¢ for Bridge Plate; 2¢ @ 2.10¢ for Angles; 2.6¢ @ 2.7¢ for Tees, and 3.3¢ for Beams and Channels, Iron or Steel.

Sheet Iron.—The market is not specially active, although sales keep pretty well in line with the output. Prices are irregular, depending a good deal on quantity, requirements as to quality, &c. The best makes command about the following prices for the ordinary run of orders:

Best Refined, Nos. 26, 27 and 28....	3¼ @ 3½¢
Best Refined, Nos. 18 to 25.....	3 @ 3¼¢
Common, ½¢ less than the above.	
Best Bloom Sheets, Nos. 26 to 28....	4¼ @ 4½¢
Best Bloom Sheets, Nos. 22 to 25....	4 @ 4¼¢
Best Bloom Sheets, Nos. 16 to 21....	3½ @ 3¾¢
Blue Annealed.....	2.8 @ 3 ¢
Best Bloom, Galvanized, discount.....	62½ ¢
Common, discount.....	67½ ¢

Merchant Steel.—Manufacturers report a largely increased demand, more particularly in Tool Steel, and state that the general condition of the market is favorable. Prices for small lots are quoted as follows: Tool Steel, 8½¢; Machinery, 2½¢; Crucible Spring, 4½¢; Open-Hearth Ordinary Spring, 2½¢ @ 2½¢; Crucible Machinery, 5¢; Best Sheet Steel, 10¢; Ordinary Sheet, 8¢.

Steel Rails.—There is very little doing in the market, although prices are a shade lower, say \$28.50 @ \$29 at mill for such deliveries as are convenient to the seller. Deliveries for September or October would probably command a slight premium, as mills are pretty well filled up for the next two months, but beyond that the outlook is not encouraging.

Old Rails.—Owing to the scarcity of spot lots, very little business has been done in this market of late, although there are indications of a desire to place

orders by large consumers. Bids of \$20.50 @ \$21 could be had for late shipments, but there appears to be very little stock available at those figures.

Scrap Iron.—Small lots sell at quoted rates, and some inquiry is made for late shipments, but the prices offered are too low to permit of much business being done. Ordinary quotations about as follows: \$18 @ \$19 for cargo lots; \$20 @ \$21 for carload lots, delivered, or for choice \$21.50 @ \$22; No. 2 do., \$14 @ \$15; Turnings, \$13 @ \$14; Old Steel Rails, \$19 @ \$20; Cast Scrap, \$14 @ \$15; do. Borings, \$9 @ \$10; Old Fish Plates, \$24 @ \$25. Old Car-Wheels, \$17 @ \$18, Philadelphia, or its equivalent.

Wrought-Iron Pipe.—A number of large orders have lately been received from parties interested in the natural gas industry, influenced, no doubt, to a certain extent, by the low prices now ruling. But with an increased demand, and the various departments full, the mills will be in a better position to advance prices later on. Discounts as follows: Black Butt-Welded, 55 %; on Galvanized do., 45 %; on Black Lap-Welded, 65 %; on Galvanized do., 52½ %; on Boiler Tubes, 60 %.

Nails.—No sign of improvement is as yet apparent in this department. The general apathy of the past two months continues, with little prospect of any immediate activity. Prices from store are quoted at \$2 @ \$2.05, carload lots at \$1.90, and in some cases less than this has been accepted.

Cleveland.

CLEVELAND, August 20, 1888.

Iron Ore.—Non-Bessemer Ores, either Hematites or Menominees, can no longer be bought for less than \$4 per ton. Gogebic Bessemer are in good demand at \$5, with but very few offerings. An especially valuable lot of about 8000 tons sold during the week at \$5.15, f.o.b. cars Cleveland. Menominee Bessemer, if not too high in phosphorus, bring \$5 readily. Many demands for Ore have been declined during the past ten days, the mine owners not being inclined to dispose of a quantity of Ore beyond their ability to mine. An inquiry for 15,000 tons from a particularly valuable mine in the Gogebic district was ignored, because of the belief that the contemplated output did not warrant further sales. If the present brisk demand could have been foreseen three months ago arrangements would undoubtedly have been made for an increased production at nearly all the ranges. Freight rates are slowly advancing, the Escanaba rate having risen from 83¢ four weeks ago to \$1.05, and the Marquette rate from \$1.05 to \$1.30. The lake shipments of Ore to date slightly exceeded 2,150,000 tons. If the all-rail shipments are added, the total is 2,325,000 tons, as against 2,575,000 tons up to a corresponding period last year. The lake shipments by districts in round numbers have been: Marquette district, 825,000 tons; Gogebic district, 635,000 tons; Menominee district, 540,000 tons; Vermillion district, 160,000 tons.

Pig Iron.—The encouraging features noticeable during the past three or four weeks continue, and the tone of the market is daily becoming firmer. Mill Irons are in very good demand at an advance of 50¢ per ton over former quotations. No. 1 Foundry Iron is also held at an advance, and an upward tendency is discernable everywhere. The belief that the market cannot much longer remain stationary, and that substantial advances will soon be made in quotations for all marketable Iron, seems universal.

Scrap Iron.—A few sales of Wrought Scrap at figures said to be below \$17.50,

but closely guarded, are reported. Old American Rails bring \$20.50, and Old Wheels \$18.75.

Cincinnati.

CINCINNATI, August 20, 1888.

Pig Iron.—Confidence is the feature of special prominence in the local Pig-Iron market. The volume of business during the past week has been only moderate, and there has been no further advance in prices, except in special instances, which are no criterion of the general market. The higher prices established during the past month, however, have been fully sustained, and the outlook is favorable for an additional advance of moment. Furnaces with full order-books are very independent, at least for the present, and will only accept new business when accompanied by offers to pay a further advance for favors received. Buyers continue to make frequent inquiries, but the attitude of sellers repels rather than encourages them. Intelligent consumers, however, are not slow to buy when a favorable opportunity offers, they recognizing the strength of producers' positions at the beginning of an active season. Furnaces place much reliance in the report that consumption is at present about 1000 tons per day in excess of production, but the latter is said to be slightly increasing. Cincinnati firms have made few, if any, 1000-ton sales during the week of either Foundry or Mill grades, but there have been several 500 and two 600-ton lots sold, and a number of car-load transactions. The aggregate for the week is doubtless between 8000 and 10,000 tons. No. 2 Southern Foundry Iron has been sold, delivered in New York, at about \$18, cash, here; No. 2 Southern Mill is quotable at \$14, and No. 1 has been sold equivalent to \$14.50 @ \$14.75, cash, here, mainly at the outside rate. Silver grades have sold at about \$16.75 and Medium Bright Iron at \$14.75 here. Moderate sales of Southern Car-Wheel have been made at \$24.50, cash. Lake Superior Iron is in light supply. Mill iron continues to be relatively more difficult to obtain than Foundry grades. The following are the approximate quotations for the local market, cash, f.o.b. Cincinnati:

Hot-Blast Foundry.

Southern Coke, No. 1.....	\$17.00 @	\$18.00
Southern Coke, No. 2.....	16.00 @	16.50
Southern Coke, No. 3.....	15.00 @	15.50
Ohio Soft Stone Coal, No. 1.....	17.00 @	17.50
Ohio Soft Stone Coal, No. 2.....	15.50 @	16.00
Mahoning and Shenango Valley.....	16.50 @	17.00
Hanging Rock Charcoal, No. 1.....	20.50 @	22.50
Hanging Rock Charcoal, No. 2.....	19.00 @	21.00
Tennessee and Alabama Charcoal, No. 1.....	18.00 @	18.50
Tennessee and Alabama Charcoal, No. 2.....	17.00 @	17.50

Forge.

Strong Neutral Coke.....	14.00 @	14.50
Mottled Neutral Coke.....	13.00 @	13.50
No. 1 Mill Coke.....	14.50 @	14.75
No. 2 Mill Coke.....	14.00 @	14.25

Car-Wheel and Malleable Irons.

Southern Car-Wheel.....	20.00 @	23.00
Hanging Rock, Cold Blast.....	22.00 @	25.00
Lake Superior Car-Wheel and Malleable.....	20.50 @	21.00

Manufactured Iron.—There has been a fair degree of activity in all kinds and the market has improved in tone, without change in prices. Common Bar Iron, 1.90¢ @ 2¢; Charcoal Bar Iron, 2.90¢ @ 3¢; Sheet Iron, Boiled, Nos. 10 to 27, 2.50¢ @ 3.25¢; Sheet Iron, Charcoal, Nos. 15 to 25, 3½¢ @ 4½¢ @ lb.

Nails.—The market has ruled steady under a fair jobbing demand and an ample supply. Jobbing prices are based upon 12d @ 40d, which sell at \$2 @ keg, with 10¢ rebate in carload lots, at mills; 50d @ 60d, 25¢; 10d, 10¢; 8d @ 9d, 25¢; 6d @ 7d, 40¢; 4d @ 5d, 60¢; 3d, 1¢, and 2d \$1.50 per keg more. Steel Nails sell at \$2 and Steel Wire Nails at \$2.65 @ \$2.75 @ keg.

Old Material.—The demand for Old Rails has further increased and prices have advanced \$1 @ ton. At the close there are buyers here at \$21 @ ton, but none are offered, except at far-off points. There has been but little inquiry for Old Wheels, which are nominally quotable at \$19, cash, here.

Louisville.

LOUISVILLE, KY., August 18, 1888.

Pig Iron.—The price of Iron has advanced during the past week 50¢ a ton, and buying has been general. Furnaces, however, have not been willing to sell for deliveries extending longer than January in most cases. It is more difficult to obtain Iron than to effect sales, as on inquiry for large lots of Iron it is found that Southern furnaces are not in position to sell for prompt shipment and not disposed to make sales for deliveries extending beyond the year. Silver Gray Iron continues very scarce, and parties holding the Iron are able to get their own price. This movement has been caused by buying in the West, especially in Chicago and St. Louis, as the Eastern market remains firm, with but a slight tendency upward. The present advance first started in the East and was followed by Cincinnati and Louisville. Other Western buyers, feeling that the market could not improve, were not willing to pay better prices than they had been paying for the past three months. However, a change has occurred during the past week, and at present Chicago and St. Louis are specially active in buying Iron. Old Wheels and Rails are in active demand. The advance of prices of Coke East has also been of benefit to the market, as consumers believe it is a legitimate advance made by the demand of furnaces for fuel, on account of their ability to obtain good prices for Iron. Every one is rejoiced over the situation and delighted that the present market did not descend as low as that experienced during the last great decline. It is not thought, however, that the market will advance much more, nor is it thought to the interest of furnaces to have too rapid changes in prices take place.

Southern Coke, No. 1 Foundry.....	\$16.75 @	\$17.75
" No. 2.....	15.75 @	16.75
" No. 2½.....	15.25 @	15.75
Hanging Rock Coke, No. 1 Foundry.....	17.25 @	17.75
Hanging Rock Charcoal, No. 1 Foundry.....	21.00 @	23.25
Southern Charcoal, No. 1 Foundry.....	18.00 @	18.50
Silver Gray, different grades.....	14.25 @	15.00
Southern Coke, No. 1 Mill, Neutral.....	13.50 @	14.50
" No. 2.....	13.00 @	14.00
" No. 1 "Cold Short.....	13.00 @	14.00
Charcoal, No. 1 Mill.....	14.25 @	14.50
White and Mottled, different grades.....	12.75 @	13.25
Southern Car-Wheel, standard brands.....	22.25 @	25.25
Southern Car-Wheel, other brands.....	19.25 @	21.25
Hanging Rock, Cold Blast.....	23.25 @	25.25
Hanging Rock, Warm Blast.....	19.25 @	20.25

Detroit.

WILLIAM F. JARVIS & Co., under date of August 20, report as follows: Since our last report a number of inquiries for round lots of Lake Superior Charcoal Iron have been received and a number of orders have been booked. The furnaces that cannot deliver after the close of navigation are compelled to refuse orders at 50 cents over prices at which they sold a month ago. Their inability to furnish the Iron desired naturally causes the furnaces that can deliver the year round to hold at firmer prices, as they expect to sell to better advantage later on. Mahoning Valley furnaces claim that they are able to obtain 50¢ @ \$1 @ ton advance for Bessemer and Mill Irons, and a few of these furnaces have withdrawn from the market for the present, as they are unable to deliver Iron as fast as required on orders already booked. If they remain out of the market for any length of time, an advance

will certainly take place. There is a good market for Old Wheels, but sellers are asking more of an advance than buyers are willing to pay, so that there have been but few sales made. With a firm market we quote as follows:

Lake Superior Charcoal, all numbers.....	\$20.00 @	\$20.50
Lake Superior Coke, all ore.....	19.25 @	19.75
Lake Superior Coke, cinder mixed.....	18.00 @	18.50
Standard Ohio Black Band.....	19.25 @	19.75
Southern No. 2.....	17.75 @	18.25
Southern Gray Forge.....	15.75 @	16.25
Southern Silvery.....	17.00 @	17.50
Jackson County (Ohio) Silvery.....	18.50 @	19.00
Old Wheels.....	19.25 @	20.00

Pittsburgh.

Office of *The Iron Age*, 77 Fourth Ave.,
PITTSBURGH, August 21, 1888.

While there is nothing developed as yet that can be properly characterized as a boom, there has been within the past week a general hardening of prices for all kinds of Iron and Steel, which may be attributed mainly to the recent advance in Pig Iron. That there will be a good demand for all kinds of manufactured goods this fall scarcely admits of a doubt, but in view of the immense capacity for making the same it is probable that prices will be close, the natural result of an active competition. One of the chief events of the week was a resumption of river navigation; over 1,000,000 bushels of Coal were shipped to Cincinnati, and a good deal more would have been started but for the fact that the water was scant, making it risky. And besides there was nothing in the business to justify shippers in taking extra risks. The Coal markets below are well supplied, and there is no particular anxiety to make additional shipments. It looks as if the local Coal market would be considerably improved before long.

Pig Iron.—There is an active market and prices have further advanced, sales of Mill Iron having been made at an improvement of from 15¢ to 25¢ @ ton, as compared with the prices of a week ago, and within the last four or five weeks of almost \$1. While some operators are confident that prices will go still higher, others equally well informed are not so strong in the faith. They point to the idle furnaces which are liable to be started upon short notice, thereby leading to an increased production, as sufficient to cause a feeling of apprehension, but those who are bullishly inclined make a strong point of light supply, as well as the large and probability of increased consumption. The demand for Foundry Irons continues light, but is expected to improve as the fall season becomes more advanced. Bessemer strong with considerable inquiry, but \$17.25, cash, still appears to be the ruling price, at which there was a sale of 2500 tons reported; rumors prevail of sales having been made at \$17.50, cash, but they are not well authenticated, unless for special analysis. We quote prices as follows:

Neutral Gray Forge.....	\$14.50 @	\$15.00, cash
All Ore Mill.....	15.50 @	16.00, "
White and Mottled.....	13.50 @	14.00, "
No. 1 Foundry.....	16.75 @	17.00, "
No. 2 Foundry.....	15.75 @	16.25, "
Charcoal Foundry.....	21.00 @	24.00, "
Cold Blast Charcoal.....	25.00 @	28.00, "
Bessemer Iron.....	17.25 @	17.50, "

Muck Bar.—There is more inquiry and prices have further advanced. We now quote at \$27 @ \$27.50, cash, although as yet there have been, so far as we can hear, but few sales made at the outside quotation. As compared with the lowest point, there has been an advance of \$1.25 to \$1.50 @ ton, and unless there is a reaction in Pig Iron a still further advance is not improbable.

Manufactured Iron.—There is an increasing demand for all kinds of finished Iron, and prices are firmer and higher; there has been an advance probably of \$1 @ ton. The upward tendency of prices

has stimulated demand. Bars may be quoted at \$1.80 @ \$1.85, 60 days, 2% off for cash, for first quality Iron. Skelp Iron is higher and is now quoted at \$1.70 @ \$1.75.

Nails.—The general position of the Nail trade remains unchanged. Here in Pittsburgh business is dull, which is owing to the fact that buyers can do better elsewhere, and very few orders are being placed here in consequence. We continue to quote at \$1.90 for 12d to 40d, 60 days, 2% off for cash, which is the regular card price, but buyers, as already intimated, have, until quite recently, been able to do better elsewhere. Probably now that Nail Plate has stiffened there will be but few sellers found below card rates, which are low enough in the present condition of affairs. It is possible that those who have been cutting the life out of the market will now want to advance the card, but those who have been refusing to cut below card rates will doubtless refuse, as it would only give the former another chance to cut. The Pittsburgh manufacturers are determined not to sell at or below actual cost of production.

Wrought-Iron Pipe.—There is an increasing business, but it is still considerably short of what it was a year ago. While some of the mills are pretty well employed others are not, and, while business bids fair to further improve, no special activity can reasonably be expected during the remainder of the year. Prices are firmer, owing to increased cost of Pipe Iron, which has gone up fully \$1 per ton. As repeatedly stated in these reports, the market has been in an unsettled condition in regard to prices since last winter, each firm making its own prices, hence it is difficult to give accurate quotations. Discounts on Black Butt Welded may be given at 55%; on Black Lap Welded, 65%; on Galvanized Butt Welded, 47½%; on Galvanized Lap Welded, 52½%; Boiler Tubes, 65% off. The above appear to be the leading rates in this market.

Old Rails.—There is considerable inquiry for Old Iron Rails, with but few to be had, and prices are still tending upward. Sales have been made during the week under review at \$22, and some of the brokers say they could obtain an advance of 50¢ to \$1 per ton if they could get them for immediate delivery. The advance in the price of domestic Rails will open the way for foreign in this market, but it is probable that they too will advance. Old Steel Rails are also in demand and tending upward; may be quoted at \$20.50 @ \$21.50.

Billets, &c.—There is a continued good demand for Bessemer Billets and prices are tending upward; we now quote at \$28.50 @ \$29, cash; Nail Slabs may be quoted at \$28.50; sale 1000 tons Bloom Ends at \$18.50, cash; Steel Rails are still quoted at \$31 @ \$31.50, cash, at mill.

Railway Track Supplies.—Railway Spikes remain unchanged at \$2, 30 days, delivered; Splice Bars, \$1.80 @ \$1.85; Track Bolts, \$2.85 with Square and \$2.95 with Hexagon Nuts.

Old Material.—There is an increase in demand for all kinds of Old Material and prices are firmer. No. 1 Wrought Scrap, \$19, net ton; Car Axles quoted at \$22 @ \$23, net; Wrought Turnings, \$13 @ \$13.50; Cast Borings, \$12, gross ton; Cast Scrap, \$15; Old Car Wheels, \$19 @ \$20, Mixed Steel Scrap, \$16.25, gross; Short Piece Steel Rails, \$17 @ \$17.25.

The co-partnership heretofore existing between Frank S. Moorhead and John Moorhead, Jr., under the style of Moorhead, Brother & Co., proprietors of the Vesuvius Iron and Nails Works, of Pitts-

burgh, has been dissolved by the retirement of Frank L. Moorhead. The business will be conducted by the remaining partner in the name and style of Moorhead, Brother & Co.

New York.

Office of *The Iron Age*, 66 and 68 Duane street, New York, August 22, 1888.

American Pig.—The majority of dealers and furnace agents report that there is a better feeling, while some assert that consumption is still below last year's average. Founders are reported to be prompt in covering their requirements as soon as they have closed contracts, and it is pointed out that this departure from the practice of taking their chances till the last moment is in itself an important gain. There is less pressure to sell, notably on the part of furnaces in Virginia, Alabama and Tennessee, but we hear of Tennessee No. 1 Foundry still selling at \$17.50. Standard brands of No. 1 Northern Iron are selling at \$18, and \$18.50 is being secured for small lots, and \$19 for choice Irons. In No. 2 we hear of offers of good brands, though not all-ore Iron, at \$16 @ \$16.50. In Gray Forge the recent activity, during which a number of heavy blocks were placed, has subsided.

Scotch Pig.—Some importers report a run of small orders for Scotch as softeners, while others find the trade very dull. The advance on the other side will only have the effect here of curtailing what little business there is, since Scotch Pig at present prices is relatively too dear to be extensively used. Efforts to boom warrants on the other side, through the aid of American operations, are not finding much favor. The market there is said to be on the eve of an advance if it can be shown or can be made to appear as though there were buying on American account. We quote: Coltness, \$19.75 @ \$20; Dalmellington, 18.75 @ \$19.25, and Langloan, \$19.50.

Bessemer Pig.—Sales of several thousand tons of foreign Bessemer are reported, a part being best West Coast brands and a part special Pig.

Spiegeleisen and Ferro.—Spiegeleisen remained dull at \$26 for German and \$27 for English 20% nominally. Foreign Ferro is held higher, \$50 @ \$50.50 for 80%, the price having advanced abroad on account of a scarcity of Ore.

Bar Iron.—We continue to quote for carload lots, half extras, on dock, 1.57½¢ @ 1.65¢ for Common; 1.65¢ @ 1.7¢ for Medium, and 1.75¢ @ 1.9¢ for Refined.

Structural Iron.—We quote for round lots, on dock: Sheared Plates, 2¢ @ 2.10¢; Universal Mill Plates, 2.10¢ @ 2.15¢; Angles, 2.5¢ @ 2.15¢; Tees, 2.5¢ @ 2.7¢ and Channels and Beams, 3.3¢.

Plates.—We quote for round lots, on dock: Iron Tank, 1.9¢ @ 2¢; Shell, 2.15¢ @ 2.30¢; Steel Tank, 2.25¢ @ 2.3¢; Shell, 2.4¢ @ 2.5¢; Flange, 2.7¢ @ 3¢, and Fire-Box, 3.7¢ @ 4¢. Galvanized Sheets are 65% @ 65 and 5%.

Steel Rails.—Sales by Eastern mills aggregate about 15,000 tons, of which one block of 5000 tons was for a Southern road, with option to double the quantity, and two others were for Coal roads, closed during the past ten days and not yet reported. The competition is extremely sharp, and the outlook is gloomy. Very few of the Eastern mills have their September capacity fully engaged, and a smaller number still have anything but straggling orders for later delivery. At this time of the year the fall requirements ought to cause a lively market, and yet the business coming up is comparatively small. The majority of contracts are made at a delivered price, and as they are

largely dependent upon special freight arrangements, the mill prices obtained are not generally known. We quote: \$28.50 @ \$29 at mill for standard sections, there being rumors of sales as low as \$29 at tidewater. In the West the condition of affairs is as bad if not worse. It is reported that 3000 tons of Rails for the Northern Pacific was sold at \$31.25 Duluth, other bids being \$31.60, \$31.65 and \$32.

Wire Rods.—There have been a number of sales at low prices for Western delivery prior to the close of navigation, low canal freights having been obtained. The German makers, disappointed in the relatively small business doing on their side, have lowered their prices to 102/ @ 103/ at shipping port, and the fact that American mills in the West have been crowded with orders has given an opportunity to again invade the Western market. We quote at tidewater \$39.50 @ \$39.75.

Old Rails.—The market has been active again, the following sales being reported: 2000 tons American Tees at \$22, delivered, Mahoning Valley; 1000 tons Tees at \$21, on barge, New York; 1500 tons foreign Tees at \$21, delivered to lighter, and 200 tons of Tees at \$21.25, delivered to lighter. We note also a sale of 3000 tons of Tees at \$18 at New Orleans, for shipment to a Western mill. The demand continues active, several inquiries of some magnitude being in the market, with \$21 bid. The supply here is light, and the Double Heads particularly are held above the market. Present prices are too low to admit of importations, but cable inquiries have already gone abroad, and the conviction is expressed by some that the winter will not pass without importations.

Scrap.—The market is dull at \$18 @ \$19 for No. 1 Wrought.

Fastenings.—The market for Spikes has been more active, and a number of large blocks have been sold; \$2.10 is now the lowest price, and there is a movement in progress among the mills to advance the price to \$2.25 at an early date. The idleness of the mill of Dilworth, Porter & Co., of Pittsburgh, and of the Ames works at Jersey City is an important feature in the situation. Angle Bars are firmer, but unchanged at 1.90¢, delivered.

Cotton Ties.—We quote \$1.05 @ \$1.12½ per bundle at Gulf ports, according to time of delivery.

Financial.

All accounts concur in representing that general trade is improving not only in volume and activity from week to week, but when compared with the corresponding date last year. As the season advances the assurance of good crops becomes more positive, accompanied by increasing evidence that the European demand will be heavy. The *London Economist* says, from reports of its special correspondents, that estimates on the French crop have been reduced to 80,000,000 hl., or 227,000,000 bushels. In Germany crop prospects were depressing. In Austria-Hungary the crop had been gathered in fair condition and was large, but after being gathered heavy rains set in and caused serious damage.

A reference to the speculative markets in this city shows unusual excitement in cotton and breadstuffs, and high prices for oil. The dry goods jobbing trade was unfavorably influenced by the extreme heat, and although better than the previous week did not realize expectations. The most interesting feature was the large business done in wool. At Boston and Philadelphia the transactions are given at nearly 11,000,000 lb., and all markets were higher, indicating that manufacturers are well supplied with orders. The

anthracite coal trade is phenomenally large. In New England special activity is noticed in shoe and leather establishments.

In the New York markets on Monday there was a collapse in August cotton, the "corner" being unable to bear up longer under the pressure. Market opened at 11.18 and closed at 10.74, a drop of 44 points. Inman, Swan & Co., the holders of the cotton, are said to have made \$3,000,000. It is also said that they still control 135,000 bales of cotton, of which 35,000 bales are loading for export. Another sensation was a sudden jump in wheat, spot stock, 2¢ @ 2½¢ per bushel, with good export trading, and millers bought more freely. Flour was also very active. At the same time there was another marked advance in grain freights to the United Kingdom. Petroleum was steady at ½¢ advance. Altogether the Produce Exchange presented a scene of unusual animation.

The Stock Exchange markets were irregular, and for the most part dull and weak. On Thursday and Friday the reaction was equal to 1½ @ 2 ¢, affecting almost the entire list. On Monday prices were firmer. The Pennsylvania road and the Vanderbilt lines advanced rates on dressed beef from Chicago to the seaboard, but the rates via Duluth and those via Chicago have not yet been equalized, and the movement looking to the restoration of rates in the Northwest made very little, if any, progress during the week. The coaling properties suffered least.

Government bonds very strong, with 4s ½ ¢ and 4½s ½ ¢ higher. Quotations are as follows:

U. S. 4½s, 1891, registered	106¾
U. S. 4½s, 1891, coupon	107¾
U. S. 4s, 1907, registered	128¼
U. S. 4s, 1907, coupon	128¾
U. S. currency 6s	120

The weekly bank statement showed a further loss of \$2,370,575 in the surplus of reserve above the 25 % legal requirements. The excess of reserve is thus reduced to \$21,736,250. The loans show a gain of \$2,118,600; the specie is decreased \$1,115,900; the legal tenders are down \$1,386,600. There is reason to believe that the actual condition of the Associated Banks is much better than that shown by the averages. In any event, the amount of the surplus reserve is considered ample for all requirements, being five times as large as it was a year ago, and over three times as large as in the preceding year. In addition, the large export movement of produce, and the lower rates for foreign exchange, together with the more liberal policy of the Secretary of the Treasury, tend to dismiss any lingering fears of monetary stringency. Money on call is 1½ ¢ @ 2 ¢. Time loans on good collateral are quoted: Sixty days, 2 @ 2½ ¢; three months, 3 ¢; four months, 3½ ¢, and six months, 4 ¢ @ 5 ¢. Commercial paper is fairly active. The best single-name paper sells at 4½ ¢ @ 5 ¢, and good double-name paper is readily placed at 4 ¢. Sterling exchange is firmer for demand bills.

The purchases of United States bonds under the circular of April 17 are as follows: Amount purchased, 4 per cents, \$22,762,600; 4½ per cents, \$10,535,300; total, \$33,297,900. Cost of 4 per cents, \$28,941,727.82; 4½ per cents, \$11,841,355.07; total, \$40,283,282.89. Secretary Fairchild has directed that all the bonds purchased by the Government since July 1 shall be applied to the purposes of the sinking fund. The estimated requirements of that fund for the present fiscal year are \$47,850,000, and the Secretary proposes to meet them, if possible, by the purchase of bonds made under the terms of the circular of April 17.

The total clearings of 38 cities for the week ending August 18 were \$871,161,388, an increase of 7.8 %, as compared with the corresponding period last year.

New York increased 7.5 ¢, Boston, 12.1 ¢, Philadelphia, 19.9 ¢, Pittsburgh, 25.1 ¢, Omaha, 31.9 ¢ and Duluth, 85.2 ¢. New Haven decreased 20.9 ¢, Galveston, 17.9 ¢, St. Joseph, 17.1 ¢, Columbus, 13.1 ¢, San Francisco, 10.4 ¢ and Cincinnati, 4.7 ¢.

Respecting crop prospects in the United States the latest Government report says the weather during the week has been favorable for growing crops in the wheat and corn regions of the Northwest, where reports indicate that the crop prospects have been improved. The St. Paul *Pioneer Press* estimates the wheat crop of Minnesota and Dakota at 100,000,000 bushels. Ultra conservative judges make the figure 10,000,000 to 15,000,000 bushels less. The Northern Pacific Railroad Company, in this city, have advices that harvesting has commenced on the Black Hills and Little Falls branches, in Dakota. The indications are that crops will be double those of last year and of the best quality. On the West Minnesota division the crop will not be gathered for a week or ten days yet in the country tributary to the Dakota line. It is predicted the crops will be the largest and best in this region for a number of years. The harvest is also in progress along the line of the St. Paul division. The cotton crop is reported to be in good condition, though some small sections in Texas are suffering from drouth.

According to the Custom House report the exports of specie from this port during the week amounted to \$240,000 and the imports were \$75,000. Since January 1 the total exports are \$26,250,000; imports, \$5,758,000.

The imports of merchandise at this port were larger, the total valuation being \$9,260,000, of which \$3,000,000 represents dry goods. Since January 1 the total is \$301,089,000, as compared with \$302,619,900 for the same time last year and \$275,925,000 in 1886.

The attorneys for the State of Iowa say in regard to the suits brought against the railroads for extortion in charges for freight: "If test cases were brought and the railroads got them into the federal courts, they could delay final adjudication for years, and in the meantime the Iowa jobbers would be ruined. Our plan is to begin a large number of cases, so that the penalties, in case the railways are defeated, would be an incentive for them to have the matter settled as soon as possible."

Metal Market.

Copper.—The market on both sides of the Atlantic has been featureless during the week, with very little disposition to trade. London improved with spot Chili Bars from £81. 10/ to £82. 10/ this morning, while futures gave way from £78. 5/ to £78; good merchantable brands advanced from £73. 5/ to £73. 10/, and Best Selected from £76 to £76. 10/, sales summing up 500 tons, while the sales here were confined to small spot lots at 16.65¢ @ 16.75¢, and 400,000 lb August at 16.65¢; for later months 16½¢ is bid. One of the oldest gentlemen in the Copper trade remarked this morning that M. Secretan only maintains such a high price for Copper in order to get from the French bankers as much money on his holdings as possible, and that the smash-up, when it does come, will be all the more fearful and disastrous. The import of Ingot Copper into France during the first six months has been 22,258 tons, against 11,013 tons last year and 9636 in 1886. Rio Tinto shares improved on the Paris Stock Exchange 21 francs last week.

Tin.—Tin touched £94. 10/ with futures last Thursday in the London market, but after some fluctuations they are now £93, while spot Tin has from £92. 15/ given

way to £92. 10/ in the meantime, sales aggregating over there 300 tons. Here but little transpired, the demand being the reverse of active; and after some wavering closes nominally as follows: Spot, 20.75¢ @ 21.10¢; August, 21.10¢ @ 21.15¢; September, 20.75¢ @ 20.90¢, and October, 20.65¢ @ 20.85¢. As per cable from Gillfillan, Wood & Co., Liverpool, to Mr. Charles Nordhaus, E. I. agent, No. 89 Water street, New York, the Straits Settlements shipped to the United States, August 1 to August 15, 150 tons of Tin against 450 same time last year, and 500 to England against 1000. Since Jan. 1 the shipments this way were 1300 and 3250 respectively, and to England they were 11,100 against 8000. **Tin Plates.**—Cokes are still scarce, and wanted and held with great firmness, other sorts have been barely sustained, and futures unsettled by the uncertain aspect of the Pig Tin market. We quote toward the close, large lines, ½ box, on the spot: Siemens-Martin Steel, charcoal finish, \$4.85 @ \$5.25; Coke finish, \$4.75; Ternes, \$4.30 @ \$4.40; Bessemer Cokes, \$4.50 @ \$4.60, and Wasters \$4.20 @ \$4.25; Liverpool is 13/6 with Coke Tin.

Lead.—The chief operator has been untiring in trying to pick up some more Lead on the spot, and October and November delivery, and in this manner some 1800 tons were sold in the open market at 4.40¢ down to 4.30¢, the quotation toward the close being 4.30¢ @ 4.35¢; 16 tons October brought 4.32½¢; 96 tons do., 4.30¢ @ 4.32½¢, and some September, 4.37½¢, on the Metal Exchange since our last report. Chicago and St. Louis are 4.30¢, strong. In London Soft Spanish remained steady at £13, while English Pig rose from £13 to £13. 5/.

Spelter.—Has attracted a great deal of attention both on 'Change and in the open market, and has been active, with a gradual rise to 5¢ on the spot for Common Domestic; 32,500 lb October Spelter brought on 'Change 4.85¢ this forenoon. The best Blende Ore out West has risen from \$22 ½ ton to \$26, and, it is anticipated, will command \$30 ere long from actual scarcity, while the demand is good. In Europe the markets have also been rising steadily, and Silesian has improved from £17 to £17. 5/. They cable thence that there is a great and growing consumptive demand over there. Silesian cannot now be laid down here for less than 5.45¢, and the quotation at the close is 5.45¢ @ 5.50¢ for it.

Antimony.—Has been moderately active 9¾¢, Hallett, and 13¾¢, Cookson. The former dropped from £39 to £38.

New York Metal Exchange.

The following sales are reported:

THURSDAY, August 16.	
25,000 lb Copper, spot	16.70¢
FRIDAY, August 17.	
175,000 lb Copper, August	16.65¢
32 tons Lead, September	4.37½¢
10 tons Tin, September	20.80¢
10 tons Tin, September	20.85¢
200,000 lb Copper, August	16.65¢
18 tons Lead, September	4.37½¢
32 tons Spelter, October	4.70¢
18 tons Spelter, October	4.72½¢
MONDAY, August 20.	
18 tons Lead, October	4.32½¢
80 tons Lead, October	4.30¢
TUESDAY, August 21.	
20 tons Tin, October	20.85¢
16 tons Lead, October	4.32½¢

Coal Market.

The Anthracite Coal market is active almost beyond precedent for this season of the year, the output from the mines being enormous, and increasing from week to week, so that the "banner month," August, 1884, is likely to be surpassed. For the week ended August 18 the total from

20 are sorted by hand, employing 36 sorters, 18 on each turn. A new shipping warehouse has lately been completed. It is located on the Bridge and Tunnel Railroad, over which all trains pass in and out of St. Louis. Its size is 100 x 172 feet, one story high, the sides being constructed of corrugated iron, and the whole building covered with a gravel roof with numerous skylights. Six cars can be loaded here at one time, and as many as 30 cars have been loaded in a day. There are 425 hands on the pay roll in all departments. Special care is given to the comfort of the employees, an instance of this being the recent erection of a bath tank for their use, in the basement of one of the main factories. It is 16 feet long, 8 feet wide and 4 feet deep, lined throughout with zinc, and running water of even temperature will be supplied to it the year round. Ample dressing rooms have also been provided. The officers of the company are as follows: William Edenborn, president; J. W. Gates, vice-president; A. Clifford, treasurer; C. H. Rowe, secretary.

The stockholders of the St. Louis Wire Mill Company are also interested in the Braddock Wire Company, whose works are at Rankin, Allegheny County, Pa. They manufacture wire rods, plain wire and barb wire. At present 36 barb-wire machines are in use in this plant, but 14 more will be added in September. The total annual capacity of the barb-wire departments of these two companies is 30,000 tons, or about one-sixth of the capacity of the entire country. Improvements have just been completed in the rod mill at Rankin, which add greatly to its efficiency and dispense with a number of workmen formerly considered necessary. This is accomplished by an arrangement of iron troughs or guides, which extend on both sides of the rolls. When the billet is inserted the resulting rod enters a trough, which curves round to the next pass, then enters a trough curving in a similar manner to another pass, and so on until it is rolled to the required gauge, when it is for the first time caught by a workman who attaches it to the reel. The troughs, of course, increase in length as each pass reduces the size of the rod. New heating furnaces have also been put in, and the officers of the company claim that they now have the best rod mill in America. It is true that they use four engines at Rankin, while only one is used in the new rod mill at Joliet, but an advantage is claimed for the former in that respect, as with one engine the relative speeds of the trains are fixed, and, as the rolls in some places wear more than in others, it is desirable to be enabled to speed up or reduce the speed of the various trains independently, which is accomplished best by separate engines. The Joliet engine is a compound condensing engine, which is very economical in fuel, and this feature is a strong recommendation for its use wherever fuel is not very cheap. At Rankin this is not a matter of so much importance. Both mills take a 4-inch billet, and make 18 passes to a No. 5 rod, and consequently about the same power is required in each case, whether furnished by one or by four engines. The sales department of both the Braddock Wire Company and the St. Louis Wire Mill Company is at 821 South Twenty-first street, St. Louis. The officers of the Braddock Wire Company are as follows: William Edenborn, president; J. W. Gates, vice-president; Thos. W. Fitch, superintendent; Wallace H. Rowe, secretary and treasurer.

President Salomon, of Hayti, is a fugitive under British protection, and the so-called "black republic" is again in control of revolutionists. United States vessels are ordered to Haytian waters.

Hardware.

Business has fallen off during the past week, and the market is considerably duller than at our last writing. Nor is this dullness confined to Hardware, but is characteristic of most other lines of business in this city. Ammunition is about the only line in which there is any great amount of business, this being the time of year which is usually most active in this line.

Wire Nails.

Complaints continue to be made of considerable irregularity, prices for small lots varying between \$2.45 and \$2.60, from store. A meeting of Wire Nail manufacturers is being held at Cleveland.

Cut Nails.

The New York market continues fairly active, with carload lots on dock selling at \$1.85 to \$1.90, and small lots from store at \$1.90 to \$2.

There is a movement on foot among some of the manufacturers of Augers and Bits to form a combination for the purpose of advancing prices. No great progress has yet been made in this direction, but the agitation of the subject has resulted in a firmer feeling among manufacturers.

The Fork and Hoe makers held their annual meeting at Rochester, N. Y., commencing on the 14th inst. and continuing in session three days. The business of the union for the past year was closed up and the association continued for another year upon substantially the same basis as heretofore, the old officers being re-elected. Prices remain unchanged.

Owing to the late advance in Pig Lead the prices of Shot have been advanced 5 cents, making Eastern prices:

Drop, per bag, 25 pounds.....	\$1.30
Drop, per bag, 5 pounds.....	.31
Buck and Chilled, per 25-pound bag.....	1.55
Buck and Chilled, per 5-pound bag.....	.36

Sisal Rope has advanced $\frac{1}{4}$ cent a pound. There is no change in Manila. The market is very firm, with small stocks of Herup. We quote at manufacturers' prices, subject to $1\frac{1}{4}$ per cent. for cash in ten days.

Manila, $\frac{1}{4}$ inch and larger.....	11 $\frac{1}{4}$ cents per lb
Manila, $\frac{3}{8}$ inch.....	12 " "
Manila, $\frac{1}{2}$ and 5-16 inch.....	12 $\frac{1}{2}$ " "
Manila Tarred Rope.....	11 " "
Manila Hay Rope.....	11 $\frac{1}{4}$ " "
Sisal, $\frac{1}{4}$ inch and larger.....	9 $\frac{3}{4}$ " "
Sisal, $\frac{3}{8}$ inch.....	10 $\frac{1}{4}$ " "
Sisal, $\frac{1}{2}$ and 5-16 inch.....	10 $\frac{3}{4}$ " "
Sisal Hay Rope.....	9 $\frac{3}{4}$ " "
Sisal Tarred Rope.....	9 $\frac{1}{4}$ " "
Sisal Medium Lath Yarn.....	8 $\frac{3}{4}$ " "

The Stanley Rule and Level Company claim that whatever the weakness of political platforms, or the fate of candidates who step on to them, the carpenters and painters of the country have a sure thing in the new Roofing Bracket illustrated in the company's advertisement to-day. A single glance at the construction of the Bracket will show that it has come to stay. Discount to the trade 20 and 10 off.

The Moore Mfg. Company, of Chicago, were succeeded on the 25th ult. by the Moore Mfg. and Foundry Company, of Milwaukee. The main office of the company is continued at 51 and 53 Franklin street, Chicago. They are erecting at Milwaukee an extensive plant for the manufacture of their line of Hardware specialties, including Door Hangers, Novelty Tackle Blocks, Vises, Differential Pulley Blocks, &c., and will also be prepared to take contracts for light and medium weight Gray Iron Castings, light machine work, forging and japanning. The new works will be put in operation about the 15th of October. An illustrated catalogue

is now in preparation, and will soon be ready for distribution.

The Nut and Bolt Works of the Lake Erie Iron Company, Cleveland, Ohio, which have been closed since July 1, owing to a disagreement with the men, have started again, the men yielding in their contest with their employers, which was merely as to frequency of payment. Their capacity is 40 tons a day of Bolts and Nuts, and with this production they feel sure of being able to make prompt shipment of orders.

The firm of Woodruff, Miller & Co., Mount Carmel, Conn., have been dissolved and a new partnership formed under the style of Walter W. Woodruff & Sons, composed of Walter W. Woodruff, Arthur E. Woodruff and Harry P. Woodruff.

By an error of the compositor in the Alford & Berkele Company's advertisement last week we made the discount on IXL Shells 40 and 50 per cent., instead of 40 and 5 per cent., which are the correct figures. We trust none of our readers were misled thereby.

The Western Toy Company, 495 to 503 Wells street, Chicago, manufacturers of Bicycles, Sleds, School-desks and furniture, suffered a severe loss by fire on the 15th inst. A number of tools, valuable machinery, and a large stock of partly completed goods were destroyed, entailing a loss of about \$5000, fully covered by insurance. Adjoining buildings, containing more costly machinery and a very heavy stock of goods, were saved.

T. T. Roberts, secretary and treasurer of the Decatur Coffin Company, of Decatur, Ill., states that their Eureka Spiral Screw Driver is meeting with increasing popularity both here and abroad. Export orders are now being regularly filled from almost all the principal countries of the world. A recent inquiry came from China, showing that even the inhabitants of the Flowery Land were aware of its good qualities, and proposed to introduce its use among their mechanics.

John Ray, a File manufacturer, of Newark, and who for some 20 years has had a good commercial rating in that city, died by his own hand on the 18th inst. The night before his death he brought home his bank books, and in other respects deliberately arranged the closing of his affairs. As he was not known to be a drinking man his troubles are attributed to a very recent divorce and subsequent marriage. He was 49 years of age.

Low & Woodruff, handling various lines of Hardware specialties at 121 Lake street, Chicago, have been appointed Northwestern agents for the Braddock Wire Company, manufacturers of Wire Rods, Wire, and Barb Wire.

By a reference to the advertisement of John H. Graham & Co., 118 Chambers street, New York, it will be seen that they have added the Birmingham Plane Mfg. Company's Iron Planes, &c., to their important list of agencies.

Organization of Heavy Hardware Jobbers.

An important meeting of the jobbers of Heavy Hardware was held at the Grand Pacific Hotel, Chicago, on the 14th and 15th insts. It was called by the Chicago jobbers, who had issued a circular a week before to the leading jobbers of Heavy Hardware throughout the country, inviting them to be present. Notwithstanding the extremely short notice given, representatives of the trade attended from Buffalo, Fort Wayne, Milwaukee, St. Paul, Davenport, St. Louis and Chicago. Establishments in Detroit, Toledo, Cleveland, Louisville, Peoria and Dubuque were heard from by letter. The object of the

meeting was to devise measures to protect the jobbing trade from the injuries claimed to be inflicted upon them by the various combinations of manufacturers now existing and others in process of formation. The holding of the conference was hastened by the combination now understood to be organizing which will embrace all the manufacturers in the country engaged in producing any class of material entering into the construction of wagons and carriages. The unanimous opinion of the jobbers present at the meeting, and those who sent letters, was in favor of united action for the protection of their business. The proceedings of the meeting were confined to the arrangement of necessary preliminaries. An organization was effected by the election of J. J. Parkhurst, of Parkhurst & Wilkinson, Chicago, as president, and of Charles R. Blake, president of the Sligo Iron Stove Company, St. Louis, as secretary. Resolutions were passed condemning the action of certain combinations of manufacturers, and the secretary was directed to send printed reports of the proceedings to the Heavy Hardware jobbers of the country and invite their co-operation in the movement. As soon as 50 to 75 houses shall have sent in their approval of the objects of the organization another meeting will be called to outline a course of procedure.

While some of the active promoters of the organization are outspoken in their denunciation of combinations, and regard them as unwholesome appendages of the manufacturing business, others are inclined to accept conditions as they find them, so that sweeping action against all combinations on the part of the jobbers' association is hardly to be expected. Their grievances consist, first, in the adoption of uniform price lists by the manufacturers entering into a combination, which price lists are made public, and which put jobbers on an equal footing with consumers able to buy in the same quantity; and, second, in the invasion of the smaller trade by the manufacturers who, in that way, compete directly with the jobbers, their best customers. It is claimed that these questions affect not only the West, in which the manufacturing interests are comparatively undeveloped, but the East, also, in which jobbing houses are still an important factor in the distribution of goods, notwithstanding the proximity of manufacturers. The organization of jobbers will therefore seek to be national in its scope, and will wield a correspondingly powerful influence in effecting the desired reform in manufacturers' prices. Its originators claim that manufacturers gladly make use of the opportunities jobbers offer for the distribution of goods at low cost; that manufacturers recognize jobbers as their best customers for many classes of goods, and that manufacturers are entirely willing to permit jobbers to handle the small trade whose orders are light and whose credit is often a matter of personal honor rather than a favorable rating in a commercial agency's report. The jobbers therefore insist that they are entitled to fair treatment in the matter of discounts, so that they can transact their business with a reasonable profit. Failing to get this, they might as well restrict their operations, discharge their travelers and conduct a purely retail trade.

In this connection the experience of the jobbers of Shelf Hardware is of interest. Some ten years since it was found by the Western jobbers particularly that their business was being seriously interfered with by the broadcast distribution of manufacturers' price lists, naming terms on which goods could be bought by any dealer, whether a jobber or a retailer. At the instance of Chicago jobbers a meeting of the Shelf Hardware jobbers of the West

was held, and the Western Hardware Association was formed for the purpose of protecting their interests. This association embraced such a large number of merchants that their complaints were treated with respect by the manufacturers, and the price lists they objected to were corrected with due regard to the jobbing trade. The fact was recognized that the jobbers filled a very important function in the cheap distribution of goods over an immense territory, which the manufacturers were not prepared to supplant or replace. For a long time the association held regular meetings, rotating from Chicago to St. Louis and Cincinnati. Other matters were taken up and settled to the great benefit of the trade. An arrangement was effected, which still continues, whereby the salesmen of any house were not to be enticed to another house. Prices, however, were not regulated by the association, it having been agreed that every member should be perfectly free to sell as he pleased. In two or three years other effects of the association began to be noted which had not been anticipated. The large jobbers found that the smaller houses in the association were getting the same discounts as themselves and were thus being enabled to gradually build up a trade which threatened in time to become formidable. Manufacturers recognized all members of the Western Hardware Association on an even footing, and carefully treated them all alike. This was not in accordance with the views of the larger jobbers, who did not propose to lose the prominence they had acquired by dint of large capital or long experience. They abandoned the association forthwith and declared that from that time every tub should stand on its own bottom. The prime object of the association had been accomplished, however, and in that respect it was regarded by the jobbers as an entire success.

Trade-Marks.

The following summary of the decision of an important trade-mark case will interest many of our readers:

Brooks & Le Page made and sold a liquid glue under the name of "Le Page's Liquid Glue," and they subsequently formed a corporation—the Russia Cement Company—which they sold out to the other parties, who continued the designation of "Le Page's Liquid Glue" as a trade-mark, under the terms of the sale, which provided for "the right to use the trade-marks belonging to or in use" by the vendor. Le Page afterward advertised that he would make and sell a glue, calling it "Le Page's Liquid Glue," and the Russia Cement Company filed a bill in equity for an injunction to restrain him from using this designation, which it claimed as a trade-mark. The trial court refused to grant the relief on the ground that it prevented the defendant from using his own name in business, and the case—*Russia Cement Company vs Le Page*—was carried to the Supreme Judicial Court of Massachusetts, where the company were awarded a judgment. Judge Devens, in the opinion, said: "Every one has the right to use his own name honestly in his own business for the purpose of advertising it, though he may incidentally injure the business of another, who may suffer a loss for which, however, there is no legal remedy, because, in law, there is no recoverable loss. While this is the general rule, it is also true that one may so sell or part with the right to use his own name as a description or designation of a manufactured article as to deprive himself of the right to use it as such, and confer this right on another. A name used as an adjective of description is not necessarily understood by the public as any assertion that the person whose name is used is the maker of the article. One who has carried on a business under a trade name, and sold a particular article in such a manner by the use of his name as a trade-mark or a trade name as to cause the business or the article to become known or established in favor under such a name, may sell or assign such trade name or trade-mark when he sells the business or manufacture, and by such sale exclude himself from the further use of it in a similar way. A person may be enjoined, therefore, from using his own name as a description of an article of his own manufacture, and from selling the article under that particular name when he has parted with the

right thus to apply it. It is not upon the ground of invasion of the trade name adopted by another, but by reason of the contract he has made, that he is deprived of the right himself to use his name as all others of the same name may use theirs. By the sale to the company of the right to use the trade-mark of the business they had bought from Le Page and his associate, the exclusive right to use the term 'Le Page's Liquid Glue' for such an article passed to it, and the injunction must be granted."

Competition in Ciphers.

Every retailer requires a system for marking goods. Wholesalers also sometimes need something of the kind, although price lists and discounts for the most part meet their requirements. Where retail prices are marked in plain figures, as is becoming very popular nowadays, there is needed some other system for recording cost price. Ciphers are in very common use for this purpose, as well also for marking selling prices, where plain figures are not employed. The number of ciphers in use must be very large. After reflecting upon this fact, and making out a short list by way of experiment, we have decided to interest our readers in gathering together those that are in use, as well also as inventing new ones. In carrying out this idea we propose some cash prizes to those who shall send in, before October 1, 1888, the largest lists of ciphers for marking goods, all subject to the terms and conditions named below.

At the outset, and in order to make our meaning perfectly clear, we may refer to one or two ciphers in common use. One that is perhaps in as general employment as any is "Blacksmith." Another is "Complaints." These words illustrate the requirements. The word used for the cipher must have 10 letters, and no letter must be used more than once. Each letter assumes the numerical value of its order in the word. For instance, in the first case, B is 1, L is 2, A is 3, and so on. Sometimes phrases are used, but they are not considered as good as a single word for the purpose. The phrase "I should try" might be employed in this way. Phrases, however, admit of slight variations so easily that they are not considered as reliable as words, and for this reason they are excluded in this contest, as will be seen by the conditions below:

GENERAL CONDITIONS.

1. The lists are restricted to ten-letter words to be found in Webster's Dictionary.
2. Phrases and proper names are excluded.
3. The lists are to be written in columnar form, and on one side of the paper only.
4. The contestants name and address must appear on each sheet of paper used.
5. Vulgarisms and words for any reason deemed unsuitable for publication will be excluded.
6. The competition will close at 5 p. m., October 1, 1888, and lists received after that time will be rejected.
7. All the lists submitted, whether awarded prizes or not, will be subject to publication, at the discretion of the Editor. Contestants names will be published or not published in connection with their lists, according to their expressed preferences.
8. This contest is open to all, there being no restrictions whatever.

PRIZES.

Two cash prizes of \$15 and \$10, respectively, are offered. To the competitor sending the largest list, in accordance with the conditions above set forth, there will be paid \$15, and to the competitor sending the next largest list there will be paid \$10. In case of a tie in the largest lists, the whole sum, \$25, will be equally divided among the authors of the same.

DECISION.

All the lists submitted will be referred to a competent committee for examination and the award of prizes will be based upon their report. The results of the contest will be published as soon after the decision is made as practicable.

The lists are to be sent by mail, in sealed envelopes, addressed "David Williams, 66 and 68 Duane street, New York," and marked in lower left-hand corner of envelope "Cipher Competition." Matter other than that relating to this contest must not be inclosed in these envelopes, as they may not be opened until in the judge's hands.

To help those who desire to make their lists as large as possible, we submit the following from the *Minneapolis Tribune*, with the suggestion that the answer to the riddle is a word which perhaps would not be otherwise thought of:

"What are all those letters for on all your goods?" asked a customer of a leading druggist.

"They indicate the cost price of the articles," was the reply.

"The cost price, eh?"

"Yes; you take a word of ten letters, no two of which are the same, and you let those represent the digits, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, and there you are."

"I see; and what cipher word did you take?" The druggist winked and smiled. "I took a word which represents what I aim to make my business. That is all I will tell you. Look around for yourself and find out what you can."

The customer did as he was bid and had soon collected the following list of prices:

	Each	Per doz.
Nail brushes.....	e	rpl
Tooth brushes.....	a	bo
Bird-seed, packages.....	f	fa
Soap, cakes.....	i	il
Cologne, bottles.....	o	fpp
Manicure cases.....	rie	rbll

From these he found the cipher word. What was it?

Annual Meeting of the Vapor Stove Association.

The annual meeting of the Vapor Stove Manufacturers' Association of the United States was held at the Russell House, Detroit, on the 7th, 8th, 9th and 10th insts. The following members were present: Geo. M. Clark and H. M. Hubbard, of Geo. M. Clark & Co., Chicago; Garson Myers, of the Adams & Westlake Company, Chicago; George Kahle and C. A. Stockstrom, of the Quick Meal Stove Company, St. Louis; E. S. Barbour, E. L. Chamberlain and A. S. Phelps, of the Detroit Stove Works, Detroit; J. B. Hughes, of the Peninsular Stove Company, Detroit; N. A. Wilson, of the Cleveland Stove Company, Cleveland; D. A. Dangler, of the Dangler Stove and Mfg. Company, Cleveland; Wm. M. Lottridge, of the Hull Vapor Stove Company, Cleveland; J. A. Marsh, of the Happy Tidings Stove Company, Cleveland; F. A. Mehling, of the Schneider & Trenkamp Company, Cleveland; W. C. North, of the American Vapor Stove Company, Cleveland; C. A. Pope, of the Aurora Vapor Stove Company, Cleveland; F. L. Alcott, of the Standard Lighting Company, Cleveland. The first day was taken up with the address of President Geo. M. Clark and the dispatch of preliminary business. Mr. Clark's address was as follows:

Gentlemen and members of the Vapor Stove Manufacturers' Association: The anniversaries of great events in the history of nations, corporations or individuals may be so observed as to be of specific value, as they serve to emphasize truth, warn of danger or chronicle success. Were it not for such mile stones as New Years and the anniversaries of our birth, who knows but what time might slip by at such a giddy, unmarked rate that we would be octogenarians before we realized that we had rounded our thirties and millionaires or bankrupts before it had occurred to us to take account of stock. Unfortunately, perhaps, time does not slip by so easily, and we are continually brought up against corners, which serve to remind us that he who does not bestir himself will most certainly be left far behind in this race which we call life. Retrospection and

reflection are not always agreeable, but, sometimes, like bitter draughts prescribed by the wise physician, they lead to health. Happy is he who, like this association, of which I deem it an honor to be a member, is called upon to indulge in little besides congratulation.

Allow me in brief words to review the progress of the manufacture of vapor stoves during the last decade and to ask and partially answer the questions, Where do we as an association of vapor stove manufacturers stand today, and what is our reasonable hope for the future? Figures speak with emphatic voice. In 1878 and 1879 1000 vapor stoves of inferior quality were made. Since that date the yearly increase has been from 5000 to 10,000, until in 1887 over 100,000 were made and sold. For 1888, without doubt, the number manufactured will reach from 120,000 to 125,000. The sale is increasing in the New England States, in California and the South. Owing to the security against accident given by continual improvement in construction, the prejudice of insurance companies to the use of gasoline stoves is gradually yielding, and, in time, will undoubtedly disappear.

Surely it is admissible that in the freedom of this gathering we should congratulate ourselves upon our substantial progress and standing. I quote, for our satisfaction, these words from a recent address before the National Association of Stove Manufacturers: "We, as manufacturers of a legitimate line, must conclude that it has been thoroughly demonstrated that gasoline and vapor stoves materially decrease our spring sales in the line of cook stoves and ranges." I believe that our association rests on a solid basis. Every effort should be made by the members to insure the strict maintenance of prices and discounts. Quite a number of regular stove manufacturers and jobbers have had a gasoline stove made for them, they themselves having no practical knowledge of the construction, or of the necessity of the most accurate workmanship on burners and correct construction throughout. This has been the occasion of some complaints which have reached me, to the effect that prices have been cut by jobbers. This cutting has arisen from jobbers having purchased a larger quantity of stoves than they have been able to dispose of, or the quality has not been up to standard. To meet this difficulty, therefore, I would suggest a smaller discount to jobbers than has heretofore prevailed, hoping that this will lessen the number of jobbers and thereby lessen the temptation to cut prices.

Allow me to say a word in regard to a subject with which the very air seems charged. I refer to trusts. Copper trust, tin trust or corner—what need is there of a trust on an article that is not even produced in this country except in very small quantity—lead trust, iron trust, soap trust, glass trust, linseed-oil trust, &c., &c. A trust on a metal or any manufactured article is usually for the purpose of reducing production and thereby forcing prices to a point above the normal. This is adverse to the public interest, and in the nature of things cannot continue. Allow me to quote from a recent writer on the trust system: "Only a short time will be required to develop its weak points, and, notwithstanding popular apprehension, it will be found that such combinations cannot rise superior to supply and demand, action and reaction, world-wide competition, and all the natural forces, which, though silent, are sovereign and continuous. There are penalties for the violation of natural laws, and, though often apparently slow, they are sure, because inherent in the nature of things. Indirect, regulative influence and unexpected compensations make their presence felt, and finally assert their supremacy over all artificial combinations."

I believe we can as an association so reduce the list price on our goods that the consumer can procure a gasoline stove or range at a lower price than heretofore. With a smaller discount to jobbers, the manufacturer would receive the same price for his goods sold through a jobber as formerly. I would recommend a reduction from our present list of* each on all high stoves, and* each on the regular junior. I would also recommend the discontinuance of the manufacture of all cheap junior stoves. No doubt your several committees have come prepared to report on matters which are vital to the interests of our association. I hope we can begin work at once and that this annual meeting arrange a list of prices, with discounts that can be maintained.

The following officers were elected for the ensuing year: President, A. S. Phelps; vice-president, Wm. Lottridge; secretary and treasurer, Garson Myers; Executive Committee, Geo. M. Clark, Geo. Kahle, D. A. Dangler, F. A. Mehling and F. L. Alcott.

* The speaker omitted to fill in the blanks representing reductions.

The report of the Executive Committee was taken up section by section and its consideration occupied the remainder of the day and the sessions of the day following until adjournment. The question of prices was thoroughly discussed and conclusions were reached on every point raised. In the new list for next year the so-called step stoves are made to list \$17, \$19 and \$21 respectively for the two, three and four burner, which prices are for the stove only. The prices on two, three and four burner stoves, with ovens attached under the top, were reduced \$1 each from the list price of last year. The stoves made with self-lighting or heating tube attachments will be listed 50 cents higher than stoves without attachments. The regular and quantity discounts remain the same as last year. It is the purpose of the association to acquire the control of the Consolidated Vapor Stove Company, and with this in view a committee was appointed to confer with that company on a form of contract which the members of the association agreed to, and which it is believed will be accepted by the company. If this is consummated the licensing power and control of the association will be in the hands of the manufacturers of vapor stoves instead of with the Consolidated Company, while all litigation and enforcement of the licenses will rest with that company, who will be controlled by a litigation committee composed of two members of each body, and if they shall not be able to agree on a policy, an application is to be made to some judge of an Ohio Court to appoint a fifth member of the committee, with power to cast a deciding vote. Measures will be taken to insure the enforcement of the agreement which are expected to be equally efficacious with both the manufacturers and the jobbers.

There were present at the session on Thursday morning Walter B. Mosman, of the Pratt Mfg. Company, 26 Broadway, New York, a branch of the Standard Oil Company, and O. J. Benham, of the naphtha department of the Standard Oil Company, both of whom were interested in the further development of the vapor stove business in providing an increased channel for the consumption of gasoline. Mr. Mosman made some remarks relative to the use of vapor stoves in New England and other Eastern States. He showed that the prejudice which had been supposed to exist in that section against vapor stoves was entirely due to a lack of information among the people relative to an article so different from anything they had heretofore used, and not to the hostility of the insurance companies. Under proper regulations the insurance companies permitted the use of gasoline, and it rested with the manufacturers of vapor stoves to acquaint the people of the East more thoroughly in relation to their use, and thus advance their mutual interest. He had no doubt that if the necessary steps were taken by manufacturers and jobbers to instruct the people in regard to the merits and advantages of vapor stoves a larger consumption of them would follow in the Eastern States. At the conclusion of his address the president was directed by vote of the association to appoint a committee to act with Mr. Mosman in this matter.

From information given by those present at the meeting it is believed that the quantity of vapor stoves made and sold in this country during the season of 1888 was easily 20 per cent. more than last year. The character of the stoves sold this year reached a higher degree of perfection than at any time in the past. In new territory, such as Texas and other Southern States, also throughout New England and other Eastern States, vapor stoves are getting a strong foothold by means of the introduction of the small, or as commonly called

cheap, junior stoves, which are meant to take the place of kerosene stoves, that have had such a large sale in the sections referred to. Wherever the small gasoline stoves have been sold for one or more seasons a good market is opened up for the full-fledged latest-improved gasoline stoves. The hope was expressed at this meeting that the stove dealers of the East would investigate for themselves the real merits of the vapor stove and be convinced of their own volition and not wait for the manufacturers to remove their doubts.

As the formation of a vapor stove trust has been talked about to some extent, and it was expected that definite action of some kind would be taken at this meeting, it should be stated that the matter was discussed, but all efforts in that direction were abandoned, as the scheme was demonstrated to be wholly impracticable. There will be no trust in vapor stoves so long as the present manufacturers have control of the trade.

The next semi-annual meeting of the association will be held at St. Louis on the first Tuesday in March, 1889.

Louisville Trade Items.

The following reaches us from Louisville under date of the 18th inst.:

The volume of the Hardware trade of Louisville, Ky., is not only up to that of last week, but is gradually increasing. The tone of the market has improved, and the large forces of clerks in the jobbing houses are kept unusually busy for this season of the year shipping out orders. Prices are still too low, with no prospect of a general advance. Sharp competition was instituted by the manufacturers early in the season, and it results in the jobbers practicing among themselves what they learned from such a demoralized school. But as each and all the dealers are well satisfied with the status of trade, and say that business is good, no one can censure them for giving their customers the benefit of low-priced goods. In fact, it is better so; the farmer gets very small returns for his work, investments of money and labor, and it is but right that he should be able to buy cheap tools and implements.

As some manufactured goods, such as Cut Nails, Bar and Sheet Iron, become a little scarcer, and the demands on the jobbers' stocks continue to increase, the dealers acquire more confidence and are quietly placing large orders, covering future probable needs. The manufacturers will not gain anything by further concessions, and now that many of them will be affected by the advance in Pig Iron the buyers hope to see them hold firm. An occasional healthy tone is given to the trade, like the recent advance in Lead, which has netted a snug sum to those dealers who were not afraid to buy at the right time. One house alone purchased eight or ten carloads of Shot; half of this they have sold at the advance, with the balance held in reserve on the approach of the best season. Lead has been selling too low, not sympathizing with Copper and other metals, and the present rise is owing to greatly reduced output, caused by low values. Other Ammunition is being taken in and shipped out in large quantities, especially Blasting Powder, this city being the source of supply for a large territory in railroad and mining operations, and considerable amounts of Blasting Powders are used in the extensive limestone quarries through this region.

Cut Nails are going out in good lots from store, and many stocks are being depleted. Some of the regular mills are unable to fill orders, as their stocks are badly broken, machinery idle and likely to remain so until prices improve a little. Wire Nails hold their own well, the store orders increasing. Barb Wire shows a large consumption, not for political fences, however, as the approaching canvasses might indicate; it is too dangerous a thing to straddle, but marks a steady improvement in putting up cheap and durable fencing.

The Outlook for Stoves.

The Metal Worker of last week speaks as follows as to the outlook of the Stove trade:

With the prospect of a large fall demand for stoves, it is not strange that leading manufacturers should be anxious about the maintenance of prices. We believe that prices are being sustained in almost all directions, although occasionally we encounter the announcement of what might be considered a step calculated to demoralize the trade. For example, a Western foundry in a trade circular referred a short time since to the reduction in cost of Pig Iron

as being a reason why stoves can be sold more cheaply at the present time than formerly. The sober second thought of every manufacturer and dealer must be to convince him that the slight reduction in Pig Iron can have but very little effect in the cost of Stoves. Pig Iron, while it is the principal material entering into Stoves, by no means represents their entire cost. Price of Stoves, in view of all the circumstances attending the trade, are low at the present time, rather than high, and buyers very generally are willing to pay the prices that are asked. What the dealer is most concerned in is that prices should be maintained. It is demoralizing to the trade to meet figures later in the season that are lower than those which were demanded when the earlier stock of goods was bought. Many Stove foundries, in order to avoid the rush of the fall trade, are urging their customers to send in early orders. This suggestion is being acted upon by many to the mutual advantage of all concerned, and for their protection as well as for other reasons prices should not fluctuate.

Arrangement of Stores.

The accompanying illustration, Fig. 261, shows a method of ceiling hangings adopted by J. P. Casselman, Grand Forks, Dak., which will be recognized as a modification of a plan we have heretofore described. The cut shows stringers made of 1-inch lumber, 2 inches wide, which run lengthwise to the store. They are suspended to the ceiling by $\frac{1}{2}$ -inch iron rods screwed in the ceiling, the lower end be-

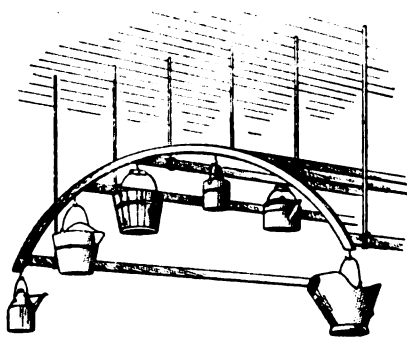


Fig. 261.—Arched Ceiling Hangings.

ing bent so as to hold the stringers. These rods are about 7 feet apart. The outer stringers are placed on the lowest down, the others rising as they approach the center, thus making an arch which when filled with Tinware and similar goods that can be appropriately hung up is referred to as presenting a fine appearance and giving a store the effect of being heavily stocked. Common screw hooks are placed in the stringers at such distances as the ware requires, 6, 9 or 12 inches apart. Connecting the ends of the stringers, as shown in the cut, is referred to as improving the effect, giving it more the appearance of an arch.

Convenient Rule for Marking Goods.

From time to time during the past few months there have appeared in these columns a number of communications from correspondents on the general subject of system in the marking of goods usually carried in stock by the retail dealer. Those who follow this practice put such prices upon their goods as will secure in one case 25 per cent., in another 33 $\frac{1}{3}$ per cent., and perhaps in still another 40 per cent. The task of computing the price at which an article must be sold to return a certain percentage profit, while not difficult, consumes valuable time, and any means looking to facilitating the operation cannot fail to be appreciated. It also happens that the dealer may attend an auction sale and desire to bid upon certain lots of goods which are offered by the dozen. Now, in buying, says an exchange, he knows exactly what one of these articles will retail for in the market where he deals; and, unless he is a good accountant,

it will often take him some time to determine whether he can make a living profit by buying them at a given figure and selling them by the single article at market price. In buying his goods by auction, as the merchant often does, he has not the time to make the calculation before the goods are bid off. He, therefore, loses the chance of making good bargains by being afraid to bid at random, or if he bids, and the goods are cried off, he may have made a poor bargain by bidding thus at a venture. It then becomes a useful and practicable problem to determine instantly what per cent. he would gain if he retailed the article at a certain price. To tell what an article should retail for to make a profit of 20 per cent.:

RULE.—Divide what the article cost per dozen by ten, which is done by removing the decimal point one place to the left.

For instance, if shovels cost \$17.50 per dozen, remove the decimal point one place to the left, making \$1.75, what they should be sold for each to gain 20 per cent. on the cost. If they cost \$31.00 per dozen they should be sold at \$3.10 each, &c. We take 20 per cent. as the basis, for the following reasons: Because we can determine instantly by simply removing the decimal point, without changing a figure, and if the goods will not bring at least 20 per cent. profit in the home market the merchant cannot afford to purchase, and should look for cheaper goods.

The reason for the above rule is obvious. If we divide the cost of a dozen by 12, we have the cost of a single article; then if we wish to make 20 per cent. on the cost, we add the per cent., which is $\frac{1}{5}$, to the $\frac{1}{12}$, making $\frac{1}{6}$ or $\frac{1}{5}$; then as we multiply the cost divided by 12 by the $\frac{1}{5}$ to find at what price one must be sold to gain 20 per cent., it is evident that the 12s will cancel and leave the cost of a dozen to be divided by 10—to do this remove the decimal point one place to the left. As removing the decimal point one place to the left, on the cost of a dozen articles, gives the selling price of a single one with 20 per cent. added, and, as the cost of any article is 100 per cent., it is obvious that the selling price would be 20 per cent. more, or 120 per cent., hence to find 50 per cent. profit, which would make the selling price 150 per cent., we would first find 120 per cent., then add 30 per cent. by increasing it one-fourth itself; for 35 per cent. increase it one-eighth itself, &c. Hence to mark an article at any per cent. profit we may use the following:

GENERAL RULE.—First find 20 per cent. profit by removing the decimal point one place to the left on the price the articles cost per dozen; then, as 20 per cent. profit is 120 per cent., add or subtract from this amount the fractional part that the required per cent. added to 100 is more or less than 120. Merchants, in marking goods, generally take a per cent.—that is, an aliquot part of 100, as 25, 33 $\frac{1}{3}$, 50, &c. The reason they do this is because it makes it much easier to add such a per cent. to the cost—for instance, a merchant could mark almost a dozen articles at 50 per cent. profit in the time it would take him to mark one at 49 per cent. The following is arranged for the convenience of business men in marking the prices of all articles bought by the dozen.

To make	20 % move point 1 place to left.	and add $\frac{1}{5}$ itself.
80 %	"	"
60 %	"	"
50 %	"	"
44 %	"	"
40 %	"	"
37 %	"	"
36 %	"	"
33 $\frac{1}{3}$ %	"	"
32 %	"	"
30 %	"	"
28 %	"	"
25 %	"	"
12 $\frac{1}{2}$ %	"	subtract
10 %	"	"
10 %	"	"

New Champion Force Pumps.

The New Champion force pump, manufactured by Clark Bros., of Belmont, N. Y., is well known to the trade, and has heretofore been illustrated in these columns, but some of the late improvement brought out by this firm will be of special interest to pump dealers, and particularly those having trade in pumps for drilled wells. The accompanying cut, Fig. 1, represents a pump designed for drilled wells of 4-inch bore and larger. It is constructed with an outer case or shell, in which the upper brass cylinder is suspended. This case or shell is just large enough to pass readily into 4-inch casing. The discharge-pipe, and a pipe on the opposite side serving as an additional support to the working parts of the pump, are screwed into the upper end of the shell

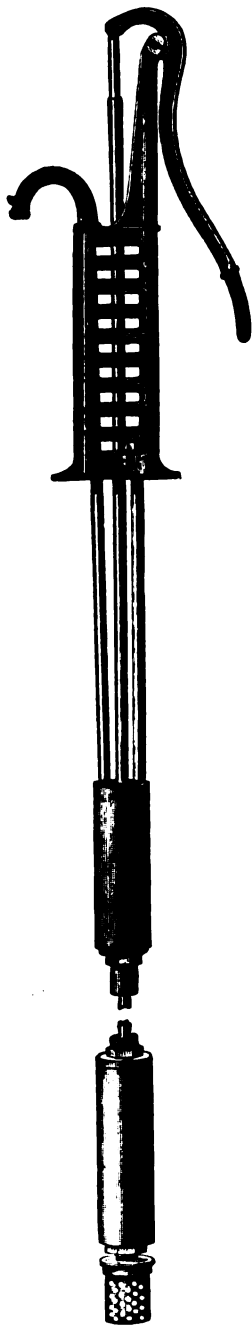


Fig. 1.—New Champion Drilled Well Force Pump.

and are connected above to a cast-iron standard of neat design, and which has been constructed with a view to securing the greatest strength with the least weight of material. The firm have been using this form of standard on all their force pumps for the past two years. The operation of this pump is the same as that of

the regular New Champion, one-half the water being discharged in the up stroke of the handle and the other half in the down stroke, and the stream is made continuous by means of the hollow piston-rod

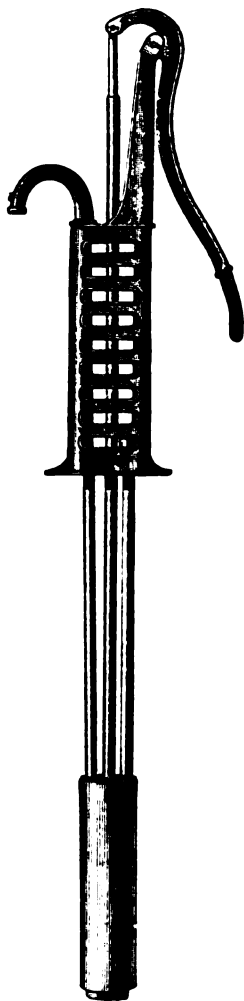


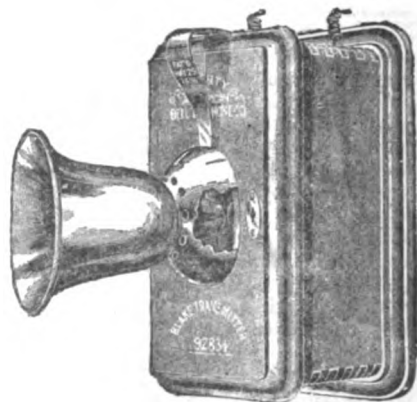
Fig. 2.—New Champion Set Length Force Pump.

air-chamber. The use of the outer case or shell is to inclose the upper cylinder and form a waterway around it to communicate with the discharge-pipe, and also form a connection for the well-pipe, which communicates with a lower cylinder placed at or near the bottom of the well. This lower cylinder is either seamless brass or iron, porcelain lined, as may be preferred by the user; but whether of brass or iron it is always fitted with a brass valve seat. This pump is also fitted with windmill attachment. Fig. 2 represents a pump constructed on the same general plan as Fig. 1, but having the upper and lower cylinders both contained in the case or shell, thus adapting it to be used as a set-length pump for shallow drilled wells. The firm also manufacture a pump having the same working parts as in Fig. 1, but slightly modified in form to adapt it for wells of smaller bore than 4 inches.

Tanner's Patent Telephone Attachment

Among the specialties brought out by the E. S. Greeley Company, No. 5 Dey street, New York, is Tanner's patent telephone attachment, a general view of which is shown in the accompanying illustration. The general shape of the attachment, as well as its peculiar features, are so well displayed in the cut that but few words of explanation are necessary. It will be noticed that it is provided with an air chamber separate from the speaking-tube. The broken part in the cut shows the extension of the speaking-tube, while surrounding it is the air-chamber. The perforations in the back are said to relieve

the concussion and avoid the rattling of the transmission diaphragm, which destroys the value of the sound vibrations produced by the voice. With the use of this attachment it is claimed that conversation can be carried on in an ordinary confidential tone. The device is made of brass, nickel-plated and highly polished. As will be seen by the cut, no screws are required to fasten it in place, as it clamps automatically to the transmitter box. This device



Tanner's Patent Telephone Attachment.

has been on the market comparatively a short time, but, judging from numerous testimonials, it has already met with considerable favor.

Foot-Power Scroll Saw.

The W. F. & John Barnes Company, No. 71 Ruby street, Rockford, Ill., are directing attention to recent improvements which they have made in what they call their No. 7 Foot-Power Scroll Saw. While the general appearance of the machine is not materially changed, the patent perforated belt, of which the company

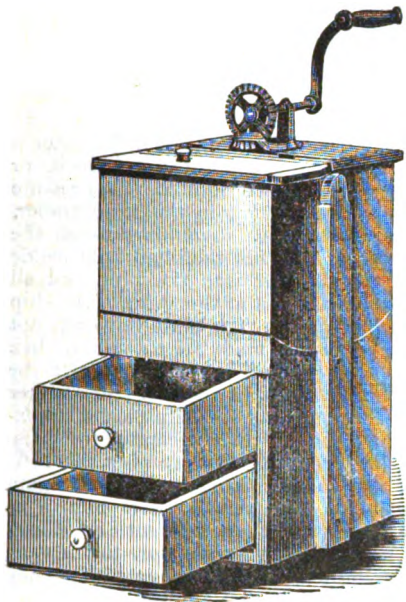


Barnes' No. 7 Foot-Power Scroll Saw.

make a specialty, has been added, taking the place of other devices not so satisfactory for use. This belt, the company inform us, has the great advantage of driving positively, and yet running so slack over the pulleys that there is very little friction in the transmission of the foot-power. The arrangement of the working parts of the improved machine is simplified, and a less number of parts is used. The company claim that the profit on running one of these machines on ordinary scrollwork at usual rates will pay for the machine in a very short time.

New Coal and Ash Sieve.

A very convenient arrangement for sifting coal and ashes has recently been devised by Mr. H. S. Brewington, of Baltimore, Md., and is being offered the hardware trade by the manufacturers, Messrs. Brewington, Bainbridge & Co., of that city. In Fig. 1 of the engravings herewith presented is shown the device ready for use, except that the drawers



Coal and Ash Sieve.—Fig. 1.—General View of Device with the Two Drawers Pulled Out.

should be closed. In Fig. 2 the coal is being turned from the cylinder into the top drawer. In the construction of this sifter the box at the top is made of wood and provided with a perforated bottom made of galvanized iron. This is made to revolve by means of a spindle, running down through the center of the box and attached to the bottom of the sieve, and is

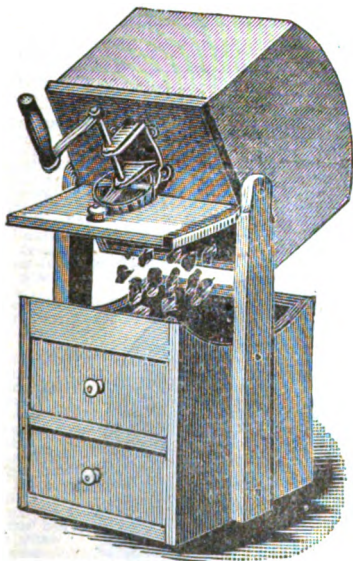


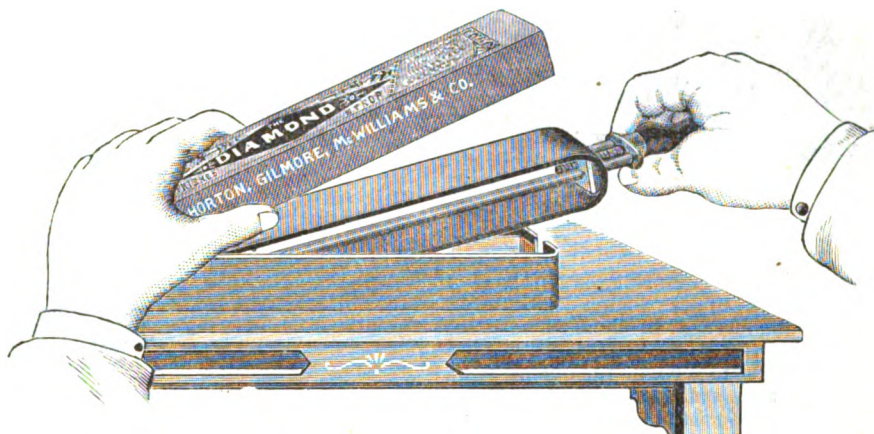
Fig. 2.—Showing Method of Dumping Contents of Box After Ashes Have Been Sifted.

operated by the crank shown in the engraving. The top drawer is provided with a perforated bottom, which also serves as a sieve, while the lower drawer has a tight bottom to hold the ashes. In operating the device the coal and ashes are turned into the box or cylinder containing the revolving mechanism. The cover is closed and the contents are agitated by turning

the handle above referred to. The ashes are thus sifted through the bottom of the box, and falling through the first drawer, which is provided with a sieve base, are retained in the lower drawer, from which they may be easily removed. The box is then tilted and the coal is dumped into the top drawer ready for use in the stove. The manufacturers claim that by means of this device a hod of coal or ashes can be sifted in 15 seconds; that it is easily managed, allows no dirt or dust to escape into the room, and will save enough coal to pay for itself in a very few weeks.

The Diamond Finished Razor Strop and Case.

Some new features in a razor strop and case have been produced by Horton, Gilmore, McWilliams & Co., of Chicago, as shown in the accompanying cut. The strop is made of the finest quality of genuine Russian leather, and the preparation with which the leather is coated is what its name implies—"Diamond finished." It is designed to produce the most perfect edge that can be put upon a razor. The case for this strop, as will be seen by the cut, is a new departure. When the sharp, keen substance of the red side of a strop gets mixed with the coating on the black finishing side, the strop is spoiled for putting on a perfect edge. This is what always occurs when the old style of case is used,



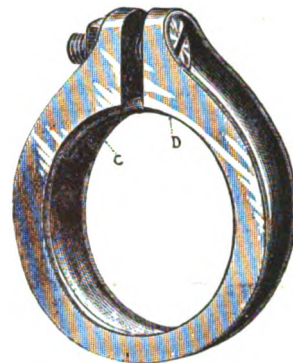
Razor Strop and Case.

unless particular care is taken each time on inserting the strop in the case. The new form of case overcomes this objection and forms a perfect protection for the strop. It will be seen that the strop is directly lifted out or put back without rubbing the coated sides. Being hinged at one end, the cover is raised by the act of withdrawing the strop. When the case is closed the strop is held securely in place by friction upon the shank of the handle. The trade-mark and the form of the case are protected by copyright granted to the firm of Horton, Gilmore, McWilliams & Co.

Tuerk's New Hose-Band Clamps.

The Tuerk Water Meter Company, of Syracuse, N. Y., are putting on the market Tuerk's new hose-band clamps, two views of which are shown in the accompanying illustrations. An important claim made for this clamp is that it can be relied upon to stand any pressure without getting loose or allowing the hose to leak. Fig. 1 illustrates the clamp screwed partly together. It will be very easily noticed that the special feature of the clamp is the overlapping tongues which slide together between the lugs, thus forming a continuous band and holding the hose as securely between the lugs as at the

other parts of circumference. The tongues and clamps are cast all in one piece, one tongue projecting from each lug of the clamp. In Fig. 2 the clamp is shown drawn tightly around the hose. The tongues at C force themselves between the hose and the clamp, and keep the hose



Tuerk's New Hose-Band Clamps.—Fig. 1.—Clamp Screwed Together.

pressed down firmly, thus preventing all danger of coming off or leaking, which was the objection encountered in the old style of clamp. Tuerk's hose-clamps are made in 11 different sizes, from $\frac{1}{4}$ to 3 inches inclusive, and are manufactured to

suit different ply hose. The Tuerk Water Meter Company will also manufacture odd sizes where desired.

The city of Providence by the free use of water meters has reduced the consumption of water to 38.9 gallons, about two-

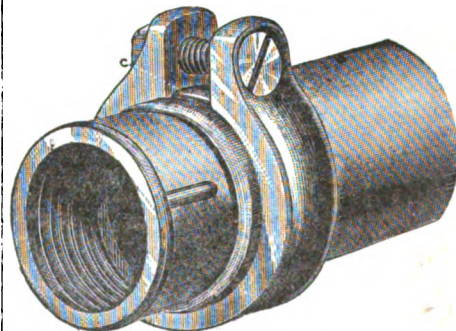
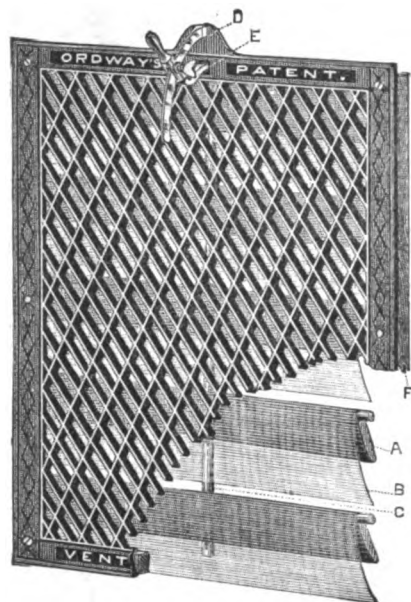


Fig. 2.—Clamp in Position on Hose.

fifths the American average in our cities. The use of meters is secured by making the water rate to those who put them in about two-thirds of what it is to those who use water without a meter. The expense of providing the meters is small and their inspection costs little.

Improved Ventilating Register.

A novel ventilating register, a general view of which is shown in the engraving presented herewith, is being placed upon the market by the Chicago Heating and Ventilating Company, of 205 West Madison street, Chicago, Ill. The device is the invention of Ira J. Ordway, president of the company, and is so arranged as to allow air to pass from the room into the ventilating flue, but prevents the air moving in the opposite direction. Referring to the engraving, A represents wooden slats to which flexible valves B are attached. The various slats, A, are fastened to the rod C at their rear side, after the same manner as ordinary window shutters are attached. The lever D, shown in the up-



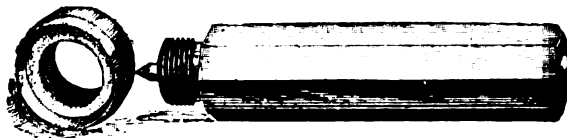
Ordway's Ventilating Register.

per part of the engraving, is firmly attached to the upper wooden slat. By means of the lever B, in connection with the thumb-screw E, the slats A can be placed or set as to regulate the quantity of air that shall be delivered into the ventilating flue. The ventilator is constructed of cast iron with a face finished in japan, nickel or bronze as may be preferred. It is attached to a wooden frame in which the slats are pinioned at its face. On the front of the slats are fastened the floating valves B, made of oil silk or other light flexible material, which entirely cover the inner face of the register when they are closed upon it by a down current of air, but are carried back by the movement of the air when the current is from the room into the flue. The inventor claims that ventilation is greatly facilitated by this device, as the air being held in the flue instead of forcing its way into the room soon becomes warmer than the outside air, and thus establishes an upward current, which draws with it the air from the room.

Improved Hollow Punch.

Some time since we directed attention to the self-centering hollow punch introduced by W. J. Rothweiler, of Newport, Ky. Quite recently the tool has been very materially improved, and is now being put out in the form shown in the accompanying engraving. The cutter is made removable and accordingly is interchangeable. As is well known to all metal workers the cutting edge of a hollow punch suffers from two causes—first, from the effort to dislodge punchings that have been forced into the cavity, and, second, from sheer carelessness or abuse. The

first of these, it is claimed, has been rendered impossible in the present tool by the automatic extractor. On the other hand, the damage from carelessness, however severe, with the use of this punch necessitates ordering simply a new cutter, and does not make it necessary to throw away the entire tool as is the case with other articles of its kind. By this means two-



Improved Hollow Punch.

fifths of the cost, it is claimed, is saved. The other good points about the tool embrace the following: Four sizes of handles answer for all sizes of cutters, and a change of cutters may be made in a few seconds of time. Referring to the engraving, it will be noticed that there is a projecting point or center, which makes it very convenient to locate the punch at the desired point to be cut. With the old style of punch this was very difficult to do. The shank is of octagon cast steel as at present manufactured; it was formerly made round. The cutters, which were formerly in one piece, are now in two and are made of English cast steel. The centering pin is 1 inch long.

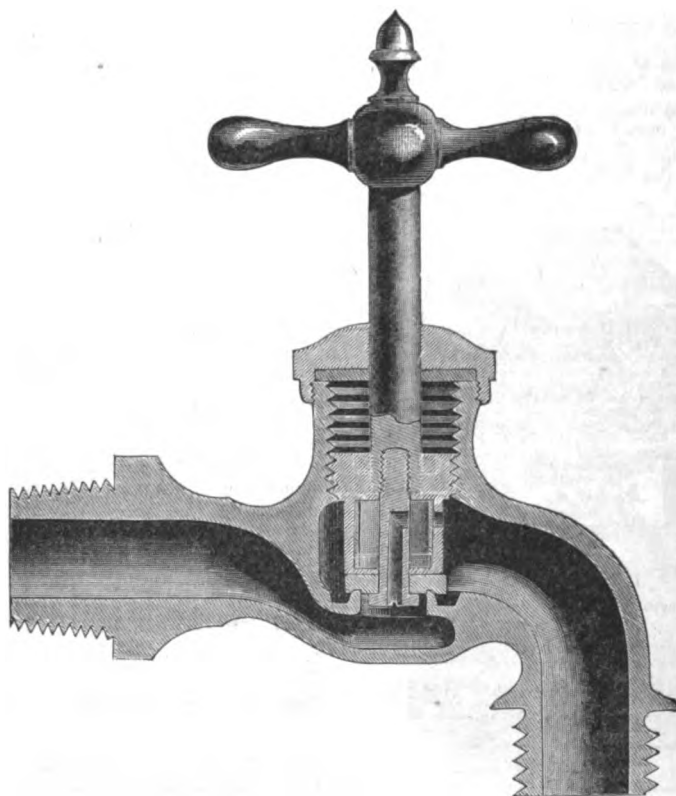
Clark's Patent Wasting Faucet.

The E. Stebbins Mfg. Company, Springfield, Mass., are putting on the market Clark's patent Self-Wasting Faucet, a sectional view of which is shown in the accompanying cut. Referring to the

head of the screw that holds the packing of the spindle there is a small hole opening into the air-chamber above mentioned. When the water is turned on it enters through this hole into the small air-chamber in the bottom of the spindle and presses the rubber packing against the small hole in the side of the air-chamber so that the appliance works like an ordi-

nary compression bibb. When the water is turned off at the stop in the basement, or wherever it may be located, the pressure being off the packing in the air-chamber, the air is at once drawn in through the nose of the bibb and the small hole inside of the air-chamber into the pipe, and all the water runs out at the waste of the stop in the basement. The bibb, however, not being opened is ready for the water when it is again turned on, thus giving it the double advantage of avoiding the danger of water remaining in the pipe and freezing, and also of water escaping from the bibb left open when the water is turned off, and not closed when the water is again turned on. The manufacturers inform us that the cost of Clark's patent Self-Wasting Faucet is but a trifle more than an ordinary bibb. They also state that they furnish samples upon application.

A syndicate composed of a number of well-known capitalists of Pittsburgh are negotiating for the purchase of the Uni-



Sectional View of Clark's Patent Self-Wasting Faucet.

illustration, it will be noticed that the lower part of the spindle of the bibb is drilled out, leaving a small air-chamber just above the seat, and there is also a small hole opening into the nose of the bibb. On the inside of this air-chamber there is a small piece of rubber packing covering the entire surface. Through the

versity building in that city. If successful the structure will be torn down and a magnificent building similar in architectural construction to the Lewis block will be erected thereon. The new structure will be six stories high, and it is proposed to make it one of the model office buildings of the city.

World's Best. 7 gross. No. 1, \$12.00; No. 2, \$24.00.
No. 3, \$36.00. \$ dos 83.00, dis 50&10
Universal. \$ dos 83.00, dis 35&5
Domestic. \$ dos 82.50, dis 45
Champion. \$ dos 82.00, dis 40

Cards.
Horse and Curry. dis 10&10 @ 10&10
Cotton. \$ 1st. Aug., 1883, dis 10 @ 10&10
Wool. dis 10 @ 10&10

Carpet stretchers.
Cast Steel, Polished. \$ dos 12.25
Cast Iron, Steel Points. \$ dos 80
Socket. \$ dos 11.75
Bullard's. dis 25 @ 25&10

Carpet Sweepers.
Bissell No. 5. \$ dos 17.00
Bissell No. 7 New Drop Pan. \$ dos 19.00
Bissell Grand. \$ dos 136.00
Grand Rapids. \$ dos 24.00
Crown Jewel. No. 1, \$18; No. 2, \$19; No. 3, \$20
Magic. \$ dos 17.00
Jewel. \$ dos 17.00
Myrtle. \$ dos 17.00
Cottage. \$ dos 17.00
Garland. \$ dos 17.00
Parlor Queen. \$ dos 24.00
Housewife's Delight. \$ dos 15.00
Queen. \$ dos 16.00
Queen, with band. \$ dos 18.00
King. \$ dos 18.00
Wood Improved. \$ dos 18.00
Hub. \$ dos 18.00
Cog Wheel. \$ dos 18.00

Cartridges—See Ammunition.

Casters.
Bed. New list:
Plate. Brass, dis 65 @ 55&5
Shallow Socket. Qthers, dis 60 @ 55&5
Deep Socket. dis 10&10
Yale Casters, list May, 1884. dis 30&10 @ 10
Yale, Gem. dis 60&10 @ 5
Martin's Patent (Phoenix). dis 45&10 @ 50
Payson's Anti-Friction. dis 60 @ 60&10
"Giant" Truck Casters. dis 10 @ 10&5
Stationary Truck Casters. dis 45&10

Castles.
Humason, Beckley & Co's. dis 70
Sargent's. dis 65&10
Hotchkiss. dis 30
Peck Stow & W. Co. dis 50&10

Chains.
Trace, 6-10-2, exact sizes, 8 pair, \$1.03
Trace, 6-10-3, exact sizes, 8 pair, 1.11
Trace, 7-10-2, exact sizes, 8 pair, 1.11
Note.—Traces, "Regular" sizes 36 net 7 pair less than exact.

Log, Fifth, Stretcher, and other fancy Chains, list Nov. 1, 1884.
American Coll 3-16 6-10 7-16 8-16 9-16 10-16 11-16 12-16 13-16 14-16 15-16 16-16 17-16 18-16 19-16 20-16 21-16 22-16 23-16 24-16 25-16 26-16 27-16 28-16 29-16 30-16 31-16 32-16 33-16 34-16 35-16 36-16 37-16 38-16 39-16 40-16 41-16 42-16 43-16 44-16 45-16 46-16 47-16 48-16 49-16 50-16 51-16 52-16 53-16 54-16 55-16 56-16 57-16 58-16 59-16 60-16 61-16 62-16 63-16 64-16 65-16 66-16 67-16 68-16 69-16 70-16 71-16 72-16 73-16 74-16 75-16 76-16 77-16 78-16 79-16 80-16 81-16 82-16 83-16 84-16 85-16 86-16 87-16 88-16 89-16 90-16 91-16 92-16 93-16 94-16 95-16 96-16 97-16 98-16 99-16 100-16
In case lots, 5.00 4.50 4.00 3.75 3.50
Less than case lots, add 1/4 @ 1/2 p. b.
German Coll, list of June 20, 1887. dis 50&10&5 @ 60
Ger. Halter Chain, list of June 20, 1887. dis 50&10&5 @ 60

Covert Halter, Hitching and Breast.
Covert Traces. dis 35&10
Onida Halter Chain. dis 60 @ 60
Galvanized Pump Chain. dis 2 5/16 @ 1/4
Jack Chain, iron. dis 70&10 @ 75
Jack Chain, brass. dis 85 @ 70

Chalk Lines—See Lines.
Chisels.
Socket Framing and Firmer—
F. S. & W. dis 75&10 @
New Haven and Middlesex. 75&10 @
Merrill. dis 60&10 @ 60&10&5
L. & J. White. dis 30 @ 30&5
Witherby and Douglass. dis 75 @ 75&5
Tanged Firmer. dis 40&10
Tanged Firmer, Butcher's. \$4.75 @ 50.00
Tanged Firmer, Spear & Jackson's. \$5.00 to 2
Tanged Firmer, Buck Bros. dis 20&10
Cold Chisels. 166 @ 186

Chucks.
Beach Patent. each, \$3.00, dis 20
Morris's Adjustable. each, \$7.00, dis 20 @ 20&5
Danbury. each, \$6.00, dis 30 @ 30&5
Syracuse, Bals Pat. dis 25
Climax. dis 25
Providence Tool Co.'s Wrought Iron. dis 25
Adjustable, Gray's. dis 20
Adjustable, Lambert's. dis 20
Adjustable, Snow's. dis 40&5
Adjustable, Hammer's. dis 15
Adjustable, Stearns'. dis 20&10
Stearns' Adjustable Cabinet and Corner. dis 20&10
Cabinet, Sargent's. dis 60&10
Carriage Makers', Sargent's. dis 60&10
Eberhard Mfg. Co. dis 40&5 @ 40&10
Warner's. dis 40&10 @ 40&10&5
Saw Clamps. See Vises

Clips.
Norway Axle, 1/4 & 5-16. dis 55&5
Second grade Norway Axle, 1/4 & 5-16. dis 65&5
Superior Axle Clips. dis 60&5 @ 60&5
Norway Spring Bar Clips, 5-16. dis 60&5
Wrought-Iron Felloe Clips. \$ 5 1/2
Steel Felloe Clips. \$ 5 1/2
Baker Axle Clips. dis 75
Decker's. dis 50

Coffers.
Hardware list. dis 40&10&2
Coffee Mills.
Box and Side, list revised Jan., 1888. dis 50&2
American, Enterprise Mfg. Co. dis 20&10 @ 30
The "Swift," Lane Bros. dis 20&10
Compases, Callipers, Dividers. dis 70 @ 70&10
Bemis & Call Co.'s Dividers. dis 60&5
Bemis & Call Co.'s Compases & Callipers. dis 60&5
Bemis & Call Co.'s Wing & Inside or Outside, dis 50&5
Bemis & Call Co.'s Double. dis 60
Bemis & Call Co.'s (Call's Patent Inside). dis 60
Excelsior. dis 50
J. Stevens & Co.'s Callipers and Dividers. dis 25&10

Coppers' Tests.
Bradley's. dis 20
Barton's. dis 20 @ 20&5
L. & J. White. dis 20&5
Albertson Mfg. Co. dis 25
Beatty's. dis 40 @ 40&5
Sandusky Tool Co. dis 30 @ 30&5

Corkscrews.
Humason & Beckley Mfg. Co. dis 40 @ 40&10
Clough's Patent. dis 38 1/2 @ 38 1/2
Howe Bros. & Hulbert. dis 35
Cern Knives and Cutters. dis 10
Wadsworth's. 4 1/2 @ 25
Cradles.—Grain. dis 50&10
Crew Bars. \$ 2 1/2
Cast Steel. \$ 2 1/2
Iron, Steel Points. \$ 3 1/2
Curry Combs. dis 50&10 @ 50&10&10
Rubber. \$ dos 10.00, dis 20
Perfect. dis 5

Curtain Pins.
Silvered Glass. net
White Enamel. net

Cutlery.
Beaver Falls and Booth's. dis 33 1/2
Wostenholme. \$7.75 to 8

Dampers, &c.
Dampers, Buffalo. dis 50
Buffalo Damper Clips. dis 50
Crown Damper. dis 40
Excelsior. dis 40&10

Dividers—See Compases.
Dog Collars.
Embossed Gilt, Pope & Stevens' list. dis 80&10
Leather, Pope & Stevens' list. dis 40
Brass, Pope & Stevens' list. dis 40

Door Springs.
Torrey's Rod, regular size. \$ con \$1.30
Gray's. \$ gro. \$20.00, dis 20
Ber Rod. \$ gro. \$20.00, dis 20
Warner's No. 1. \$ dos. \$2.50; No. 2, \$3.30, dis 40&10&5
Gem Coll, list April 19, 1888. dis 10
Star Coll, list April 19, 1888. dis 20
Victor Coll. dis 60 @ 60&10
Champion Coll. dis 60&10 @ 60&10
Philadelphia. 5 in. \$5.00; 8 in. \$7.75, dis 50
Cowell's. No. 1, \$ dos \$18.00; No. 2, \$15.00, dis 50
Rubber, complete. \$ dos \$4.50, dis 55&10
Hercules. dis 50
Shaw Door Check and Spring. dis 25 @ 80 @ 35
Elliot's Door Check and Spring. dis 25

Drainage Valves.
P. S. & W. dis 75&5 @
M. 75&10
New Haven and Middlesex. dis 60&10 @ 10
Merrill. dis 15&10 @ 25
Witherby and Douglass. dis 15&10 @ 25
Watrous. dis 15&10 @ 25
L. & J. White. dis 35
Bradley's. dis 35
Adjustable Handle. dis 25 @ 35
Wilkinson's Folding. dis 25 @ 25&5

Drills and Drill Stocks.
Blacksmith's Self Feeding. each, \$7.50, dis 20
Brass, P. S. & W. dis 10&10
Brass, Wilson's. dis 30&5
Brass, Miller's Falls. each, \$5.00, dis 25
Brass, Bartholomew's. each, \$2.50, dis 25&10 @ 40
Ratchet, Merrill's. dis 20 @ 20&5
Ratchet, Ingalls'. dis 25
Ratchet, Parker's. dis 20 @ 20&5
Ratchet, Whitney's. dis 20&10
Ratchet, Weston's. dis 20&25
Ratchet, Moore's Triple Action. dis 25 @ 30
Whitney's Hand Drill, Plain, \$11.00, Adjustable. dis 20&10
Wilson's Drill Stocks. dis 1
Automatic Boring Tools. each, \$1.75 @ \$1.65

Drills.
Morris. dis 50&10&5
Standard. dis 50&10&5
Syracuse. dis 50&10&5
Cleveland. dis 50&10&5
Williams. dis 50&10&5
Drill Bits.—See Augers and Bits.
Drill Chucks.—See Chucks.
Drilling Pans.
Small sizes. \$ 10 1/2 @ 1/2
Large sizes. \$ 10 1/2 @ 1/2

Egg Beaters.
Dover. \$ dos. \$2.00
National. \$ dos \$4.50, dis 35
Family T. & S. Mfg. Co. \$ gro. \$17.00 @ \$18.00
Kinston Standard Co. \$ gro. \$1.50
Acme Standard Co. \$ gro. \$1.50
Duplex Standard Co. \$ gro. \$1.50
Duplex, extra heavy. \$ dos extra \$5.00
Rival (Stan and Co.). \$ gro. \$2.00
Triumph T. & S. Mfg. Co. \$ gro. \$10.50 @ \$11.50
Advance No. 1. \$ gro. \$10.50
Advance No. 2. \$ gro. \$10.00
Bryant's. \$ gro. \$10.00
Ayer's. \$ gro. \$5
Double (Hamblin & Russell Mfg. Co.). \$ gro. \$16.20
Easy (Hamblin & Russell Mfg. Co.). \$ gro. \$14.00
Triple (Hamblin & Russell Mfg. Co.). \$ gro. \$14.2
Spiral (Hamblin & Russell Mfg. Co.). \$ gro. \$14.00
Paine, Dient & Co's. \$ gro. \$14.00

Egg Poachers.
Buffalo Steam Egg Poachers, \$ doz., No. 1, \$10.00;
No. 2, \$8.00.
Electric Bell Metals, Wollensaks. dis 25
Biglow & Dowse. dis 20
Gemery. No. 4 to No. 54 to Flour, CF
46 gr. 150 gr. F FF.

Enamelled and Tinned Ware.—See Hollow Ware.
Escatchoon Pins.
Iron, list Nov. 11, 1885. dis 50&10 @ 50&10&5
Brass. dis 60 @ 60&5

Escatchoons.
Door Lock. Same discounts as Door Locks
Brass Thread. dis 60 @ 60&10
Wood. dis 25

Fenn's.
Bohren's Patent Rubber Ball. dis 40
Fenn's Cork Stops. dis 35
Star. dis 60 @ 60&5
Frary's Patent Petroleum. dis 40&10&2
West's Patent Key. dis 60&10
Anchor Lock. dis 45
Metallic Key, Leather Lined. dis 60&10 @ 60&10&10
Cork Lined. dis 70 @ 70&10
Burnside's Red Cedar, bbl. lot. dis 50
J. Sommer's Best Black Tin Key. dis 40
J. Sommer's Cork Lined, list quality. dis 50
J. Sommer's Diamond Lock. dis 40
J. Sommer's Perfection, Fla. Red Cedar. dis 50
J. Sommer's Good-nough Cedar. dis 50
Excelsior, Enterprise. \$ dos \$36.00, dis 20&10
Self-Measuring, Lane's. \$ dos \$36.00, dis 25&10
Self-Measuring, Victor. \$ dos \$36.00, dis 25&10

Felloe Plates.
Fifth Wheels.—Derby and Cincinnati. dis 45&5
Files.
Domestic.
Nicholson Files, Rasps, &c. dis 60&5 @ 60&10
Nicholson (X. F.) Files. dis 25
Nicholson's Royal Files (Seconds) dis 75 (extra prices on certain sizes.)
Other makers, best brands. dis 60&5 @ 60&10&5
Fair brands. dis 60&10 @ 70
Second quality. dis 70&5 @ 75
Harrison's Horse Rasps. dis 60&7 1/2 @ 50&10
McGaffrey's Horse Rasps. dis 10&10

Imported.
J. & Riley Carr. List, April 1, 1883, dis 15
J. & Riley Carr Horse Rasps. dis 15
Moss & Gamble. List April 1, 1883, dis 15
Butcher. Butcher's list, dis 20
Steele. Steele's list, dis 30
Turton's. Turton's list, dis 20 @ 25
Greaves' Horse Rasps. American list, dis 40

Flaming Machines.
Rack, 4 1/2-inch Roll. \$2.25 each, dis 35
Rack, 6-inch Roll. \$2.50 each, dis 35
Rack, 8 1/2-inch Roll. \$2.75 each, dis 35
Rack, 10-inch Roll. \$3.00 each, dis 35
Rack, 12-inch Roll. \$3.25 each, dis 35
Rack, 14-inch Roll. \$3.50 each, dis 35
Rack, 16-inch Roll. \$3.75 each, dis 35
Rack, 18-inch Roll. \$4.00 each, dis 35
Rack, 20-inch Roll. \$4.25 each, dis 35
Rack, 22-inch Roll. \$4.50 each, dis 35
Rack, 24-inch Roll. \$4.75 each, dis 35
Rack, 26-inch Roll. \$5.00 each, dis 35
Rack, 28-inch Roll. \$5.25 each, dis 35
Rack, 30-inch Roll. \$5.50 each, dis 35
Rack, 32-inch Roll. \$5.75 each, dis 35
Rack, 34-inch Roll. \$6.00 each, dis 35
Rack, 36-inch Roll. \$6.25 each, dis 35
Rack, 38-inch Roll. \$6.50 each, dis 35
Rack, 40-inch Roll. \$6.75 each, dis 35
Rack, 42-inch Roll. \$7.00 each, dis 35
Rack, 44-inch Roll. \$7.25 each, dis 35
Rack, 46-inch Roll. \$7.50 each, dis 35
Rack, 48-inch Roll. \$7.75 each, dis 35
Rack, 50-inch Roll. \$8.00 each, dis 35
Rack, 52-inch Roll. \$8.25 each, dis 35
Rack, 54-inch Roll. \$8.50 each, dis 35
Rack, 56-inch Roll. \$8.75 each, dis 35
Rack, 58-inch Roll. \$9.00 each, dis 35
Rack, 60-inch Roll. \$9.25 each, dis 35
Rack, 62-inch Roll. \$9.50 each, dis 35
Rack, 64-inch Roll. \$9.75 each, dis 35
Rack, 66-inch Roll. \$10.00 each, dis 35
Rack, 68-inch Roll. \$10.25 each, dis 35
Rack, 70-inch Roll. \$10.50 each, dis 35
Rack, 72-inch Roll. \$10.75 each, dis 35
Rack, 74-inch Roll. \$11.00 each, dis 35
Rack, 76-inch Roll. \$11.25 each, dis 35
Rack, 78-inch Roll. \$11.50 each, dis 35
Rack, 80-inch Roll. \$11.75 each, dis 35
Rack, 82-inch Roll. \$12.00 each, dis 35
Rack, 84-inch Roll. \$12.25 each, dis 35
Rack, 86-inch Roll. \$12.50 each, dis 35
Rack, 88-inch Roll. \$12.75 each, dis 35
Rack, 90-inch Roll. \$13.00 each, dis 35
Rack, 92-inch Roll. \$13.25 each, dis 35
Rack, 94-inch Roll. \$13.50 each, dis 35
Rack, 96-inch Roll. \$13.75 each, dis 35
Rack, 98-inch Roll. \$14.00 each, dis 35
Rack, 100-inch Roll. \$14.25 each, dis 35
Rack, 102-inch Roll. \$14.50 each, dis 35
Rack, 104-inch Roll. \$14.75 each, dis 35
Rack, 106-inch Roll. \$15.00 each, dis 35
Rack, 108-inch Roll. \$15.25 each, dis 35
Rack, 110-inch Roll. \$15.50 each, dis 35
Rack, 112-inch Roll. \$15.75 each, dis 35
Rack, 114-inch Roll. \$16.00 each, dis 35
Rack, 116-inch Roll. \$16.25 each, dis 35
Rack, 118-inch Roll. \$16.50 each, dis 35
Rack, 120-inch Roll. \$16.75 each, dis 35
Rack, 122-inch Roll. \$17.00 each, dis 35
Rack, 124-inch Roll. \$17.25 each, dis 35
Rack, 126-inch Roll. \$17.50 each, dis 35
Rack, 128-inch Roll. \$17.75 each, dis 35
Rack, 130-inch Roll. \$18.00 each, dis 35
Rack, 132-inch Roll. \$18.25 each, dis 35
Rack, 134-inch Roll. \$18.50 each, dis 35
Rack, 136-inch Roll. \$18.75 each, dis 35
Rack, 138-inch Roll. \$19.00 each, dis 35
Rack, 140-inch Roll. \$19.25 each, dis 35
Rack, 142-inch Roll. \$19.50 each, dis 35
Rack, 144-inch Roll. \$19.75 each, dis 35
Rack, 146-inch Roll. \$20.00 each, dis 35
Rack, 148-inch Roll. \$20.25 each, dis 35
Rack, 150-inch Roll. \$20.50 each, dis 35
Rack, 152-inch Roll. \$20.75 each, dis 35
Rack, 154-inch Roll. \$21.00 each, dis 35
Rack, 156-inch Roll. \$21.25 each, dis 35
Rack, 158-inch Roll. \$21.50 each, dis 35
Rack, 160-inch Roll. \$21.75 each, dis 35
Rack, 162-inch Roll. \$22.00 each, dis 35
Rack, 164-inch Roll. \$22.25 each, dis 35
Rack, 166-inch Roll. \$22.50 each, dis 35
Rack, 168-inch Roll. \$22.75 each, dis 35
Rack, 170-inch Roll. \$23.00 each, dis 35
Rack, 172-inch Roll. \$23.25 each, dis 35
Rack, 174-inch Roll. \$23.50 each, dis 35
Rack, 176-inch Roll. \$23.75 each, dis 35
Rack, 178-inch Roll. \$24.00 each, dis 35
Rack, 180-inch Roll. \$24.25 each, dis 35
Rack, 182-inch Roll. \$24.50 each, dis 35
Rack, 184-inch Roll. \$24.75 each, dis 35
Rack, 186-inch Roll. \$25.00 each, dis 35
Rack, 188-inch Roll. \$25.25 each, dis 35
Rack, 190-inch Roll. \$25.50 each, dis 35
Rack, 192-inch Roll. \$25.75 each, dis 35
Rack, 194-inch Roll. \$26.00 each, dis 35
Rack, 196-inch Roll. \$26.25 each, dis 35
Rack, 198-inch Roll. \$26.50 each, dis 35
Rack, 200-inch Roll. \$26.75 each, dis 35
Rack, 202-inch Roll. \$27.00 each, dis 35
Rack, 204-inch Roll. \$27.25 each, dis 35
Rack, 206-inch Roll. \$27.50 each, dis 35
Rack, 208-inch Roll. \$27.75 each, dis 35
Rack, 210-inch Roll. \$28.00 each, dis 35
Rack, 212-inch Roll. \$28.25 each, dis 35
Rack, 214-inch Roll. \$28.50 each, dis 35
Rack, 216-inch Roll. \$28.75 each, dis 35
Rack, 218-inch Roll. \$29.00 each, dis 35
Rack, 220-inch Roll. \$29.25 each, dis 35
Rack, 222-inch Roll. \$29.50 each, dis 35
Rack, 224-inch Roll. \$29.75 each, dis 35
Rack, 226-inch Roll. \$30.00 each, dis 35
Rack, 228-inch Roll. \$30.25 each, dis 35
Rack, 230-inch Roll. \$30.50 each, dis 35
Rack, 232-inch Roll. \$30.75 each, dis 35
Rack, 234-inch Roll. \$31.00 each, dis 35
Rack, 236-inch Roll. \$31.25 each, dis 35
Rack, 238-inch Roll. \$31.50 each, dis 35
Rack, 240-inch Roll. \$31.75 each, dis 35
Rack, 242-inch Roll. \$32.00 each, dis 35
Rack, 244-inch Roll. \$32.25 each, dis 35
Rack, 246-inch Roll. \$32.50 each, dis 35
Rack, 248-inch Roll. \$32.75 each, dis 35
Rack, 250-inch Roll. \$33.00 each, dis 35
Rack, 252-inch Roll. \$33.25 each, dis 35
Rack, 254-inch Roll. \$33.50 each, dis 35
Rack, 256-inch Roll. \$33.75 each, dis 35
Rack, 258-inch Roll. \$34.00 each, dis 35
Rack, 260-inch Roll. \$34.25 each, dis 35
Rack, 262-inch Roll. \$34.50 each, dis 35
Rack, 264-inch Roll. \$34.75 each, dis 35
Rack, 266-inch Roll. \$35.00 each, dis 35
Rack, 268-inch Roll. \$35.25 each, dis 35
Rack, 270-inch Roll. \$35.50 each, dis 35
Rack, 272-inch Roll. \$35.75 each, dis 35
Rack, 274-inch Roll. \$36.00 each, dis 35
Rack, 276-inch Roll. \$36.25 each, dis 35
Rack, 278-inch Roll. \$36.50 each, dis 35
Rack, 280-inch Roll. \$36.75 each, dis 35
Rack, 282-inch Roll. \$37.00 each, dis 35
Rack, 284-inch Roll. \$37.25 each, dis 35
Rack, 286-inch Roll. \$37.50 each, dis 35
Rack, 288-inch Roll. \$37.75 each, dis 35
Rack, 290-inch Roll. \$38.00 each, dis 35
Rack, 292-inch Roll. \$38.25 each, dis 35
Rack, 294-inch Roll. \$38.50 each, dis 35
Rack, 296-inch Roll. \$38.75 each, dis 35
Rack, 298-inch Roll. \$39.00 each, dis 35
Rack, 300-inch Roll. \$39.25 each, dis 35
Rack, 302-inch Roll. \$39.50 each, dis 35
Rack, 304-inch Roll. \$39.75 each, dis 35
Rack, 306-inch Roll. \$40.00 each, dis 35
Rack, 308-inch Roll. \$40.25 each, dis 35
Rack, 310-inch Roll. \$40.50 each, dis 35
Rack, 312-inch Roll. \$40.75 each, dis 35
Rack, 314-inch Roll. \$41.00 each, dis 35
Rack, 316-inch Roll. \$41.25 each, dis 35
Rack, 318-inch Roll. \$41.50 each, dis 35
Rack, 320-inch Roll. \$41.75 each, dis 35
Rack, 322-inch Roll. \$42.00 each, dis 35
Rack, 324-inch Roll. \$42.25 each, dis 35
Rack, 326-inch Roll. \$42.50 each, dis 35
Rack, 328-inch Roll. \$42.75 each, dis 35
Rack, 330-inch Roll. \$43.00 each, dis 35
Rack, 332-inch Roll. \$43.25 each, dis 35
Rack, 334-inch Roll. \$43.50 each, dis 35
Rack, 336-inch Roll. \$43.75 each, dis 35
Rack, 338-inch Roll. \$44.00 each, dis 35
Rack, 340-inch Roll. \$44.25 each, dis 35
Rack, 342-inch Roll. \$44.50 each, dis 35
Rack, 344-inch Roll. \$44.75 each, dis 35
Rack, 346-inch Roll. \$45.00 each, dis 35
Rack, 348-inch Roll. \$45.25 each, dis 35
Rack, 350-inch Roll. \$45.50 each, dis 35
Rack, 352-inch Roll. \$45.75 each, dis 35

Climax Steel Anti-Friction.....	dis 50 1
Zenith for Wood Track.....	dis 55 1
Reed's Steel Arm.....	dis 5 1
Challenge, Harn Uxor.....	dis 50 1
Sterling Improved (Anti-Friction).....	dis 45 10 1
Victor, No. 1, 1 1/2; No. 2, 2 1/2; No. 3, 3 1/2.....	dis 50 10 1
Chertreuse.....	dis 50 10 1
Kidder's.....	dis 50 10 1
The "Rox".....	dis 50 10 1
Best Anti-Friction.....	dis 50 10 1
Duplex, Wood Track.....	dis 50 10 1
Terry's Patent.....	dis 50 10 1
Crone's Patent.....	dis 50 10 1
Wood Track Iron Clad.....	dis 50 10 1
Carrier Steel Anti-Friction.....	dis 50 10 1
Architect.....	dis 50 10 1
Eclipse.....	dis 50 10 1
Felix.....	dis 50 10 1
Richards.....	dis 50 10 1
Lane's Steel Anti-Friction.....	dis 50 10 1
The Ball Bearing Door Hanger.....	dis 50 10 1
Warner's Patent.....	dis 50 10 1
Stearns' Anti-Friction.....	dis 50 10 1
Stearns' Challenge.....	dis 50 10 1
Faultless.....	dis 50 10 1
American.....	dis 50 10 1
Rider & Wooster, No. 1, 62 1/2; No. 2, 75.....	dis 50 10 1
Paragon, Nos. 1, 2 and 3.....	dis 50 10 1
Paragon, Nos. 5, 5 1/2, 7 and 8.....	dis 50 10 1
Present.....	dis 50 10 1
Nickel, Cast Iron and Steel.....	dis 50 10 1
Scranton Anti-Friction Single Strap.....	dis 50 10 1
Scranton Anti-Friction Double Strap.....	dis 50 10 1
Universal Anti-Friction.....	dis 50 10 1
Wild West, 4 in. wheel, 15; 5 in. wheel, 21.....	dis 50 10 1
Harness Snaps.—See Snaps.	
Hatchets.—List Jan. 1, 1888.	
Isiah Hook.....	dis 30 10 1
Hunt's Shinking Lath and Claw.....	dis 40 10 1
Hunt's Broad.....	dis 40 10 1
Buffalo Hammer Co.....	dis 40 10 1
Hurd's.....	dis 40 10 1
Fayette R. Plumb.....	dis 40 10 1
Wm. Mann, Jr., & Co.....	dis 40 10 1
Underhill Edge Tool Co.....	dis 40 10 1
Underhill's Nails and Bright goods.....	dis 40 10 1
C. Hammond & Son.....	dis 40 10 1
St. Chamons.....	dis 40 10 1
Pek's.....	dis 40 10 1
Kelly's.....	dis 40 10 1
Sargent & Co.....	dis 40 10 1
Ten Eyck Edge Tool Co.....	dis 40 10 1
Collins, following list.....	dis 40 10 1
Shilling, No. 123.....	dis 40 10 1
Claw, No. 123.....	dis 40 10 1
Lathing, No. 123.....	dis 40 10 1
Hay Knives.....	dis 40 10 1
Lightning.....	dis 40 10 1
Electric.....	dis 40 10 1
Gem.....	dis 40 10 1
Wadsworth's.....	dis 40 10 1
Carter's Needle.....	dis 40 10 1
Heath's.....	dis 40 10 1
Hinges.	
Wrought Iron Hinges—	
Strap and T.....	dis 70 10 1
Screw Hook and.....	dis 70 10 1
Strap.....	dis 70 10 1
Heavy Welded Hook.....	dis 70 10 1
Screw Hook and Eye.....	dis 70 10 1
Roller Blind Hinges, Nos. 32 and 34.....	dis 70 10 1
Roller Blind Hinges, Nos. 232 and 234.....	dis 70 10 1
Roller Plate.....	dis 70 10 1
Roller Raised.....	dis 70 10 1
Plate Hinges, 1 1/2, 1 3/4, 1 1/2, 1 3/4.....	dis 70 10 1
"Providence" over 12 in.....	dis 70 10 1
Spring Hinges—	
Geer's Spring and Blank Butts.....	dis 70 10 1
Union Springs Hinge Co.'s list, March, 1888.....	dis 70 10 1
Acme and U. S.....	dis 70 10 1
Empire and Crown.....	dis 70 10 1
Hero and Monarch.....	dis 70 10 1
American, Gem, and Star, Japanned.....	dis 70 10 1
American, Gem, and Star, Bronzed.....	dis 70 10 1
Oxford, Bronze and Brass.....	dis 70 10 1
Barked, Double Acting.....	dis 70 10 1
Union Mfg. Co.....	dis 70 10 1
Bommer's.....	dis 70 10 1
Buckman's.....	dis 70 10 1
Chicago.....	dis 70 10 1
Gate Hinges—	
Western.....	dis 70 10 1
N. E.....	dis 70 10 1
N. E. Reversing.....	dis 70 10 1
Clark's, Nos. 1, 2, 3.....	dis 70 10 1
N. Y. State.....	dis 70 10 1
Automatic.....	dis 70 10 1
Common Sense.....	dis 70 10 1
Seymour's.....	dis 70 10 1
Shepard's.....	dis 70 10 1
Reed's Latch and Hinges.....	dis 70 10 1
Steel Hinges—	
Parker.....	dis 70 10 1
Palmer.....	dis 70 10 1
Seymour.....	dis 70 10 1
Nicholson.....	dis 70 10 1
Huffer.....	dis 70 10 1
Clark's, Nos. 1, 2, 3, 4 and 5.....	dis 70 10 1
Clark's Mortise Gravity.....	dis 70 10 1
Sargent's, Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13.....	dis 70 10 1
Sargent's, No. 13.....	dis 70 10 1
Reading's Gravity.....	dis 70 10 1
Shepard's Noiseless Niagara, Buffalo, Champion.....	dis 70 10 1
Steamboat, Clark's Old Pattern and Clark's Tip Pattern.....	dis 70 10 1
Shepard's O. S. Lull & Porter.....	dis 70 10 1
Shepard's Acme, Lull & Porter.....	dis 70 10 1
Shepard's Queen City Reversible.....	dis 70 10 1
Clark's Lull & Porter, Nos. 0, 1, 1 1/2, 2, 2 1/2, 3.....	dis 70 10 1
North's Automatic Blind Fixtures, No. 2, for Wood, \$10.50; No. 3, for Brick, \$13.50.....	dis 70 10 1
Blinds.	
Garden, Mortar, &c.....	dis 70 10 1
Planter's, Cotton, &c.....	dis 70 10 1
Warren Hoe.....	dis 70 10 1
Magic.....	dis 70 10 1
Doors.	
D. & H. Scovill.....	dis 70 10 1
Lane's Crescent Scovill Pattern.....	dis 70 10 1
Lane's Crescent Planter Pattern.....	dis 70 10 1
Lane's Razor Blade, Scovill Pattern.....	dis 70 10 1
Maynard.....	dis 70 10 1
Sandusky Tool Co.....	dis 70 10 1
Hubbard & Co.....	dis 70 10 1
Bare.....	dis 70 10 1
Grab.....	dis 70 10 1
Hill's Improved Ringers.	
Hill's Improved Ringers.....	dis 70 10 1
Hill's Old Style Ringers.....	dis 70 10 1
Hill's Tongs.....	dis 70 10 1
Hill's Rings.....	dis 70 10 1
Perfect Rings.....	dis 70 10 1
Perfect Rings.....	dis 70 10 1

Hair's Hog Ringers.....	dis 20 10 1
Champion Ringers.....	dis 20 10 1
Champion Ringers, Double.....	dis 20 10 1
Brown's Ringers.....	dis 20 10 1
Brown's Ringers.....	dis 20 10 1
Holding Apparatus.	
"Moore's" Hand Holst, with Lock Brake.....	dis 20 10 1
"Moore's" Differential Pulley Block.....	dis 20 10 1
Holders, File and Tool.	
Rail Pat.....	dis 20 10 1
Nicholson File Holders.....	dis 20 10 1
Hollow Ware.	
Stove Hollow Ware, Ground.....	dis 70 10 1
Stove Hollow Ware, Unground.....	dis 70 10 1
enameled and Tinned Hollow Ware.....	dis 70 10 1
Oval Boilers, Saucepans & Gine Pots.....	dis 70 10 1
Gray Enamelled Ware.....	dis 70 10 1
Asate and Granite Ware.....	dis 70 10 1
Rustless Hollow Ware.....	dis 70 10 1
Galvanized Tea-Kettles.....	dis 70 10 1
Incub.	
Each.....	dis 70 10 1
Stove Plated—4 mo. or 5 1/2 oash in 30 days.....	dis 70 10 1
Reed & Barton.....	dis 70 10 1
Meriden Britannia Co.....	dis 70 10 1
Simpson, Hall, Miller & Co.....	dis 70 10 1
Rogers & Brother.....	dis 70 10 1
Hartford Silver Plating Co.....	dis 70 10 1
William Rogers Mfg. Co.....	dis 70 10 1
Iron.	
Bird Cage, Sargent's list.....	dis 70 10 1
Bird Cage, Reading list.....	dis 70 10 1
Clothes Line, Sargent's list.....	dis 70 10 1
Clothes Line, Reading list.....	dis 70 10 1
Celling, Sargent's list.....	dis 70 10 1
Harness, Reading list.....	dis 70 10 1
Coat and Hat, Sargent's list.....	dis 70 10 1
Coat and Hat, Reading list.....	dis 70 10 1
Wrought Iron.	
Cotton Pat., N. Y. Mallet & Handle Wks.....	dis 70 10 1
Tassel and Picture T. & S. Mfg. Co.....	dis 70 10 1
Wrought Staples, Hooks, &c.....	dis 70 10 1
Bench Hooks.....	dis 70 10 1
Wire.	
Wire Coat and Hat, Gem, list April, 1888.....	dis 70 10 1
Wire Coat and Hat, Miles, list April, 1888.....	dis 70 10 1
Indestructible Coat and Hat.....	dis 70 10 1
Wire Coat and Hat, Standard.....	dis 70 10 1
Belt.....	dis 70 10 1
Grass.....	dis 70 10 1
Whiffles.....	dis 70 10 1
Hooks and Eyes—Malleable Iron.....	dis 70 10 1
Hooks and Eyes—Brass.....	dis 70 10 1
Fish Hooks, American.....	dis 70 10 1
Horse Nails.	
Ansable.....	dis 70 10 1
Clinton, Pin.....	dis 70 10 1
Essex.....	dis 70 10 1
Lyra.....	dis 70 10 1
Snowden.....	dis 70 10 1
Putnam.....	dis 70 10 1
Vulcan.....	dis 70 10 1
Northwestern.....	dis 70 10 1
Globe.....	dis 70 10 1
A. C.....	dis 70 10 1
C. B. K.....	dis 70 10 1
Champion.....	dis 70 10 1
New Haven.....	dis 70 10 1
Saranac.....	dis 70 10 1
Champion.....	dis 70 10 1
Capwell.....	dis 70 10 1
Star.....	dis 70 10 1
Anchor.....	dis 70 10 1
Western.....	dis 70 10 1
Empire Bronzed.....	dis 70 10 1
Horse Shoes.—See Shoes, Horse.	
Hose, Rubber, competition.	
Standard.....	dis 70 10 1
Extra.....	dis 70 10 1
N. Y. B. & P. Co., Extra.....	dis 70 10 1
N. Y. B. & P. Co., Dundee.....	dis 70 10 1
Hushers.	
Blair's Adjustable.....	dis 70 10 1
Blair's Adjustable Clipper.....	dis 70 10 1
Ice Picks, Chisels, &c.	
National Ice Chisel.....	dis 70 10 1
Norway Ice Breakers.....	dis 70 10 1
Dunlap's Ring Picks.....	dis 70 10 1
Wood Head Picks, Sargent's.....	dis 70 10 1
Iron Head Picks, Sargent's.....	dis 70 10 1
Ice Mallets, Pick in handle.....	dis 70 10 1
Ice Axes, Small Coat or Mail.....	dis 70 10 1
Combination Ice Tool.....	dis 70 10 1
Acme Ice Pick and Tongue.....	dis 70 10 1
Roger's Lightning Ice Chisel.....	dis 70 10 1
Ice Tongs.	
Champion, S. S. & Co.....	dis 70 10 1
Family.....	dis 70 10 1
Jack Screws.—See Screws.	
Kettles.	
Brass, 7 to 17 in.....	dis 70 10 1
Brass larger than 17 inches.....	dis 70 10 1
Enamelled and Tea Kettles.....	dis 70 10 1
Keys.	
Lock Ass'n list Dec. 30, 1888.....	dis 70 10 1
Eagle, Cabinet, Trunk and Padlock.....	dis 70 10 1
Hotchkiss' Brass Blanks.....	dis 70 10 1
Hotchkiss' Copper and Tinned.....	dis 70 10 1
Hotchkiss' Padlock and Cabinet.....	dis 70 10 1
Hotchkiss' Bed Keys.....	dis 70 10 1
Knife Sharpeners.	
Parkin's Applewood Handles.....	dis 70 10 1
Parkin's Rosewood or Cocobolo.....	dis 70 10 1
Knives.	
Wilson's Butcher Knives.....	dis 70 10 1
Ames' Butcher Knives.....	dis 70 10 1
Nichols' Butcher Knives.....	dis 70 10 1
Ames' Shoe Knives.....	dis 70 10 1
Ames' Bread Knives.....	dis 70 10 1
Moran's Shoe and Bread Knives.....	dis 70 10 1
Hay and Straw.....	dis 70 10 1
Table and Pocket.....	dis 70 10 1
Knobs.	
Door Mineral.....	dis 70 10 1
Door Por. Jar'd.....	dis 70 10 1
Door Por. Por. Nickel.....	dis 70 10 1
Door Por. Plated, Nickel.....	dis 70 10 1
Drawer, Porcelain.....	dis 70 10 1
Hemlock Door Knobs, new list.....	dis 70 10 1
Yale & Towne Wood Knobs, list Dec., 1888.....	dis 70 10 1
Furniture Plain.....	dis 70 10 1
Furniture, Wood Screws.....	dis 70 10 1
Base, Rubber Tip.....	dis 70 10 1
Picture, Judd's.....	dis 70 10 1
Picture, Sargent's.....	dis 70 10 1
Picture, Hemlock.....	dis 70 10 1
Shutter, Porcelain.....	dis 70 10 1
Carriage, Japanned.....	dis 70 10 1

Ladies.	
Melting, Sargent's.....	dis 55 10 1
Melting, Reading.....	dis 55 10 1
Melting, Monroe's Patent.....	dis 54.00, dis 40 10 1
Melting, P. S. & W.....	dis 55 10 1
Melting, Warner's.....	dis 55 10 1
Lawn Mowers.	
Standard List.....	dis 50 10 1
Enterprise.....	dis 60 10 1
Lanterns.	
Reflector, Plain, with Guards.....	dis 40 10 1
Reflector, Lift Wire, with Guards.....	dis 40 10 1
Reflector, Square Plain, with Guards.....	dis 40 10 1
Reflector, Sq. Lift Wire, with Guards.....	dis 40 10 1
Without Guards, 25¢ dozen less.....	dis 40 10 1
Police, small, \$3.00; Med. \$7.25; Large, \$9.75.....	dis 50 10 1
Lemon Squeezers.	
Porcelain Lined, No. 1.....	dis 25 10 1
Wood, No. 2.....	dis 30 10 1
Wood, Common.....	dis 30 10 1
Dunlap's Improved.....	dis 30 10 1
Sammis, No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.....	dis 25 10 1
Penning's "Star".....	dis 25 10 1
Dean's.....	dis 25 10 1
Little Giant.....	dis 50 10 1
King.....	dis 50 10 1
Lines.	
Cotton and Linen Fin. Drapers.....	dis 60 10 1
Draper's Chalk.....	dis 60 10 1
Draper's Mason's Linen, 84 ft., No. 1, \$1.25; No. 2, \$1.75; No. 3, \$2.25; No. 4, \$2.75; No. 5, \$3.25.....	dis 60 10 1
Cotton Chalk.....	dis 60 10 1
Samson, Cotton, No. 4, \$2; No. 4 1/2, \$2.50; No. 5, \$3.....	dis 60 10 1
Shirley Lake, Broad, No. 0, \$4.00; No. 1, \$4.50; No. 2, \$5.00; No. 3, \$5.50; No. 4, \$6.00; No. 5, \$6.50; No. 6, \$7.00; No. 7, \$7.50; No. 8, \$8.00; No. 9, \$8.50; No. 10, \$9.00; No. 11, \$9.50; No. 12, \$10.00; No. 13, \$10.50; No. 14, \$11.00; No. 15, \$11.50; No. 16, \$12.00; No. 17, \$12.50; No. 18, \$13.00; No. 19, \$13.50; No. 20, \$14.00; No. 21, \$14.50; No. 22, \$15.00; No. 23, \$15.50; No. 24, \$16.00; No. 25, \$16.50; No. 26, \$17.00; No. 27, \$17.50; No. 28, \$18.00; No. 29, \$18.50; No. 30, \$19.00; No. 31, \$19.50; No. 32, \$20.00; No. 33, \$20.50; No. 34, \$21.00; No. 35, \$21.50; No. 36, \$22.00; No. 37, \$22.50; No. 38, \$23.00; No. 39, \$23.50; No. 40, \$24.00; No. 41, \$24.50; No. 42, \$25.00; No. 43, \$25.50; No. 44, \$26.00; No. 45, \$26.50; No. 46, \$27.00; No. 47, \$27.50; No. 48, \$28.00; No. 49, \$28.50; No. 50, \$29.00; No. 51, \$29.50; No. 52, \$30.00; No. 53, \$30.50; No. 54, \$31.00; No. 55, \$31.50; No. 56, \$32.00; No. 57, \$32.50; No. 58, \$33.00; No. 59, \$33.50; No. 60, \$34.00; No. 61, \$34.50; No. 62, \$35.00; No. 63, \$35.50; No. 64, \$36.00; No. 65, \$36.50; No. 66, \$37.00; No. 67, \$37.50; No. 68, \$38.00; No. 69, \$38.50; No. 70, \$39.00; No. 71, \$39.50; No. 72, \$40.00; No. 73, \$40.50; No. 74, \$41.00; No. 75, \$41.50; No. 76, \$42.00; No. 77, \$42.50; No. 78, \$43.00; No. 79, \$43.50; No. 80, \$44.00; No. 81, \$44.50; No. 82, \$45.00; No. 83, \$45.50; No. 84, \$46.00; No. 85, \$46.50; No. 86, \$47.00; No. 87, \$47.50; No. 88, \$48.00; No. 89, \$48.50; No. 90, \$49.00; No. 91, \$49.50; No. 92, \$50.00; No. 93, \$50.50; No. 94, \$51.00; No. 95, \$51.50; No. 96, \$52.00; No. 97, \$52.50; No. 98, \$53.00; No. 99, \$53.50; No. 100, \$54.00.....	dis 60 10 1
Masons' Linen, No. 3 1/2, \$1.50; No. 4, \$2; No. 4 1/2, \$2.50; No. 5, \$3.....	dis 60 10 1
Masons' Colored Cotton.....	dis 60 10 1
Wire Clothes, No. 18, \$3.00; No. 19, \$3.00; No. 20, \$3.00; No. 21, \$3.00; No. 22, \$	

Pennsylvania.....dis 40&10 1/2
Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000, 1001, 1002, 1003, 1004, 1005, 1006, 1007, 1008, 1009, 1010, 1011, 1012, 1013, 1014, 1015, 1016, 1017, 1018, 1019, 1020, 1021, 1022, 1023, 1024, 1025, 1026, 1027, 1028, 1029, 1030, 1031, 1032, 1033, 1034, 1035, 1036, 1037, 1038, 1039, 1040, 1041, 1042, 1043, 1044, 1045, 1046, 1047, 1048, 1049, 1050, 1051, 1052, 1053, 1054, 1055, 1056, 1057, 1058, 1059, 1060, 1061, 1062, 1063, 1064, 1065, 1066, 1067, 1068, 1069, 1070, 1071, 1072, 1073, 1074, 1075, 1076, 1077, 1078, 1079, 1080, 1081, 1082, 1083, 1084, 1085, 1086, 1087, 1088, 1089, 1090, 1091, 1092, 1093, 1094, 1095, 1096, 1097, 1098, 1099, 1100, 1101, 1102, 1103, 1104, 1105, 1106, 1107, 1108, 1109, 1110, 1111, 1112, 1113, 1114, 1115, 1116, 1117, 1118, 1119, 1120, 1121, 1122, 1123, 1124, 1125, 1126, 1127, 1128, 1129, 1130, 1131, 1132, 1133, 1134, 1135, 1136, 1137, 1138, 1139, 1140, 1141, 1142, 1143, 1144, 1145, 1146, 1147, 1148, 1149, 1150, 1151, 1152, 1153, 1154, 1155, 1156, 1157, 1158, 1159, 1160, 1161, 1162, 1163, 1164, 1165, 1166, 1167, 1168, 1169, 1170, 1171, 1172, 1173, 1174, 1175, 1176, 1177, 1178, 1179, 1180, 1181, 1182, 1183, 1184, 1185, 1186, 1187, 1188, 1189, 1190, 1191, 1192, 1193, 1194, 1195, 1196, 1197, 1198, 1199, 1200, 1201, 1202, 1203, 1204, 1205, 1206, 1207, 1208, 1209, 1210, 1211, 1212, 1213, 1214, 1215, 1216, 1217, 1218, 1219, 1220, 1221, 1222, 1223, 1224, 1225, 1226, 1227, 1228, 1229, 1230, 1231, 1232, 1233, 1234, 1235, 1236, 1237, 1238, 1239, 1240, 1241, 1242, 1243, 1244, 1245, 1246, 1247, 1248, 1249, 1250, 1251, 1252, 1253, 1254, 1255, 1256, 1257, 1258, 1259, 1260, 1261, 1262, 1263, 1264, 1265, 1266, 1267, 1268, 1269, 1270, 1271, 1272, 1273, 1274, 1275, 1276, 1277, 1278, 1279, 1280, 1281, 1282, 1283, 1284, 1285, 1286, 1287, 1288, 1289, 1290, 1291, 1292, 1293, 1294, 1295, 1296, 1297, 1298, 1299, 1300, 1301, 1302, 1303, 1304, 1305, 1306, 1307, 1308, 1309, 1310, 1311, 1312, 1313, 1314, 1315, 1316, 1317, 1318, 1319, 1320, 1321, 1322, 1323, 1324, 1325, 1326, 1327, 1328, 1329, 1330, 1331, 1332, 1333, 1334, 1335, 1336, 1337, 1338, 1339, 1340, 1341, 1342, 1343, 1344, 1345, 1346, 1347, 1348, 1349, 1350, 1351, 1352, 1353, 1354, 1355, 1356, 1357, 1358, 1359, 1360, 1361, 1362, 1363, 1364, 1365, 1366, 1367, 1368, 1369, 1370, 1371, 1372, 1373, 1374, 1375, 1376, 1377, 1378, 1379, 1380, 1381, 1382, 1383, 1384, 1385, 1386, 1387, 1388, 1389, 1390, 1391, 1392, 1393, 1394, 1395, 1396, 1397, 1398, 1399, 1400, 1401, 1402, 1403, 1404, 1405, 1406, 1407, 1408, 1409, 1410, 1411, 1412, 1413, 1414, 1415, 1416, 1417, 1418, 1419, 1420, 1421, 1422, 1423, 1424, 1425, 1426, 1427, 1428, 1429, 1430, 1431, 1432, 1433, 1434, 1435, 1436, 1437, 1438, 1439, 1440, 1441, 1442, 1443, 1444, 1445, 1446, 1447, 1448, 1449, 1450, 1451, 1452, 1453, 1454, 1455, 1456, 1457, 1458, 1459, 1460, 1461, 1462, 1463, 1464, 1465, 1466, 1467, 1468, 1469, 1470, 1471, 1472, 1473, 1474, 1475, 1476, 1477, 1478, 1479, 1480, 1481, 1482, 1483, 1484, 1485, 1486, 1487, 1488, 1489, 1490, 1491, 1492, 1493, 1494, 1495, 1496, 1497, 1498, 1499, 1500, 1501, 1502, 1503, 1504, 1505, 1506, 1507, 1508, 1509, 1510, 1511, 1512, 1513, 1514, 1515, 1516, 1517, 1518, 1519, 1520, 1521, 1522, 1523, 1524, 1525, 1526, 1527, 1528, 1529, 1530, 1531, 1532, 1533, 1534, 1535, 1536, 1537, 1538, 1539, 1540, 1541, 1542, 1543, 1544, 1545, 1546, 1547, 1548, 1549, 1550, 1551, 1552, 1553, 1554, 1555, 1556, 1557, 1558, 1559, 1560, 1561, 1562, 1563, 1564, 1565, 1566, 1567, 1568, 1569, 1570, 1571, 1572, 1573, 1574, 1575, 1576, 1577, 1578, 1579, 1580, 1581, 1582, 1583, 1584, 1585, 1586, 1587, 1588, 1589, 1590, 1591, 1592, 1593, 1594, 1595, 1596, 1597, 1598, 1599, 1600, 1601, 1602, 1603, 1604, 1605, 1606, 1607, 1608, 1609, 1610, 1611, 1612, 1613, 1614, 1615, 1616, 1617, 1618, 1619, 1620, 1621, 1622, 1623, 1624, 1625, 1626, 1627, 1628, 1629, 1630, 1631, 1632, 1633, 1634, 1635, 1636, 1637, 1638, 1639, 1640, 1641, 1642, 1643, 1644, 1645, 1646, 1647, 1648, 1649, 1650, 1651, 1652, 1653, 1654, 1655, 1656, 1657, 1658, 1659, 1660, 1661, 1662, 1663, 1664, 1665, 1666, 1667, 1668, 1669, 1670, 1671, 1672, 1673, 1674, 1675, 1676, 1677, 1678, 1679, 1680, 1681, 1682, 1683, 1684, 1685, 1686, 1687, 1688, 1689, 1690, 1691, 1692, 1693, 1694, 1695, 1696, 1697, 1698, 1699, 1700, 1701, 1702, 1703, 1704, 1705, 1706, 1707, 1708, 1709, 1710, 1711, 1712, 1713, 1714, 1715, 1716, 1717, 1718, 1719, 1720, 1721, 1722, 1723, 1724, 1725, 1726, 1727, 1728, 1729, 1730, 1731, 1732, 1733, 1734, 1735, 1736, 1737, 1738, 1739, 1740, 1741, 1742, 1743, 1744, 1745, 1746, 1747, 1748, 1749, 1750, 1751, 1752, 1753, 1754, 1755, 1756, 1757, 1758, 1759, 1760, 1761, 1762, 1763, 1764, 1765, 1766, 1767, 1768, 1769, 1770, 1771, 1772, 1773, 1774, 1775, 1776, 1777, 1778, 1779, 1780, 1781, 1782, 1783, 1784, 1785, 1786, 1787, 1788, 1789, 1790, 1791, 1792, 1793, 1794, 1795, 1796, 1797, 1798, 1799, 1800, 1801, 1802, 1803, 1804, 1805, 1806, 1807, 1808, 1809, 1810, 1811, 1812, 1813, 1814, 1815, 1816, 1817, 1818, 1819, 1820, 1821, 1822, 1823, 1824, 1825, 1826, 1827, 1828, 1829, 1830, 1831, 1832, 1833, 1834, 1835, 1836, 1837, 1838, 1839, 1840, 1841, 1842, 1843, 1844, 1845, 1846, 1847, 1848, 1849, 1850, 1851, 1852, 1853, 1854, 1855, 1856, 1857, 1858, 1859, 1860, 1861, 1862, 1863, 1864, 1865, 1866, 1867, 1868, 1869, 1870, 1871, 1872, 1873, 1874, 1875, 1876, 1877, 1878, 1879, 1880, 1881, 1882, 1883, 1884, 1885, 1886, 1887, 1888, 1889, 1890, 1891, 1892, 1893, 1894, 1895, 1896, 1897, 1898, 1899, 1900, 1901, 1902, 1903, 1904, 1905, 1906, 1907, 1908, 1909, 1910, 1911, 1912, 1913, 1914, 1915, 1916, 1917, 1918, 1919, 1920, 1921, 1922, 1923, 1924, 1925, 1926, 1927, 1928, 1929, 1930, 1931, 1932, 1933, 1934, 1935, 1936, 1937, 1938, 1939, 1940, 1941, 1942, 1943, 1944, 1945, 1946, 1947, 1948, 1949, 1950, 1951, 1952, 1953, 1954, 1955, 1956, 1957, 1958, 1959, 1960, 1961, 1962, 1963, 1964, 1965, 1966, 1967, 1968, 1969, 1970, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223,

Lat. "Decoy"	gross \$10.00, dis 10
Head, "Decoy"	gross \$10
Cyclone	gross \$5.25
Hotchkiss Metallic Mouse, 5-hole traps	do \$20
In full cases	do 75
Trawels.	
Lothrop's Brick and Plastering	dis 25
Reich and Plastering	dis 15
Diamond's Brick and Plastering	dis 35 @ 25-10
Peacock's Plastering	dis 25
Clement & Maynard's	dis 20
Rose's Brick	dis 15 @ 20
Brace's Brick	dis 25
Corrall's Brick and Plastering	dis 25
Gardner's	dis 70
Triers.—Butter and Cheese	dis 25
Trucks, Warehouse, &c.	
B. & L. Block Co.'s List, 1883	dis 40
Tubes. Beller.—See Pipe	
Twine.	
No. 12, Flax Twine, 1/4 and 1/2 Balls	BC. 50
No. 12, " " " and " " Balls	50
No. 18, " " " and " " Balls	215
No. 18, " " " and " " Balls	18
No. 24, " " " and " " Balls	185
No. 36, " " " and " " Balls	165
No. 24, Mattress, " and "	45 @ 50
Chalk Line, Cotton, " Balls	55
2-Ply Hemp, 1/4 and 1/2 Balls (Spring Twine)	1145
2-Ply Hemp, 1/4 Balls	13
2-Ply Hemp, 1/4 Balls	11
Cotton Wrapping, 5 Balls to a	155 @ 105
2, 3, 4 and 5 Ply Jute, 1/4 Balls	645 @ 105
Pool	645 @ 105
Paint	155 @ 105
Cotton Mops—3, 6, 12 and 15 ft. to do	155
Vases.	
Solid Box	dis 50 @ 60 & 65
Parallel.	
Fisher & Norris Double Screw	dis 15-10
Stephens'	dis 35 @ 30
Ward's	dis 25 @ 25
Wilson's	dis 55
Howard's	dis 40
Bonney's	dis 40-10
Millers Falls	dis 40 @ 40
Trenton	dis 40-10
Merrill's	dis 15-10
Saginaw	dis 60-10
Backus and Union	dis 40
Double Screw Loe	dis 15-10
Prentiss	dis 20-10 @ 25
Stimpson's Adjustable	dis 40
Saw Files.	
Bonney's. Nos. 3 & 3	dis \$15.00, dis 4 @ 10
Stearns	dis \$34-10 @ 38-10
Stearns' Silent Saw Vices	dis 33-
Sargent's	dis 60-10
Hopkins'	dis \$17.50, dis 10
Reading	dis 40-10
Wentworth	dis 20-10
Combination and Vice	gross 30
Cowell Hand Vices	dis 10
Bauer's Pipe Vices	dis 10
Wagon Boxes.	
Per lb.	dis
Wagon Jacks.	
Daisy	dis \$4.00, dis 25
Washer Cutters.	
Smith's Patent	dis \$12.00, dis 40-10
Jannson's	dis \$11.00, dis 33-
Penny's	dis \$11.00, dis 33-
Appleton's	dis \$12.00, dis 40-10
Bonney's	dis 20-10
Washers.	
Size	5-15 1/2 1/4 3/4 1 1 1/2
In lots less than 200 yds. 1/2 yds. 1/4 yds. 3/4 yds. 1 yds. 1 1/2 yds.	
Wedges.—Iron	dis 25
Steel	dis 25
Well Buckets, Galvanized.	
Bill's	dis 12 qt., \$4.25; 14 qt., \$5.25
Iron City	dis 12 qt., \$4.25; 14 qt., \$5.25
Whiting's Flat Iron Band	dis \$4.25 @ \$4.50
Whiting's Waxed Top	dis \$4.00 @ \$3.25
Well Wheels—3 in., \$2.25; 10 in., \$2.70; 15 in., \$3.25	
Wire.	
Market. Br. & Ann. Nos. 0 to 18	dis 75 @ 75-10
Market. Coppered. Nos. 0 to 18	dis 70 @ 70-10
Market. Galvanized. Nos. 0 to 18	dis 65-10
Market. Tin'd. Tinned List Nos. 0 to 18	dis 67-10 @ 72-10
Stone Br. & Ann'd. Nos. 18 to 18	dis 72-10 @ 75-10
Stone Br. & Ann'd. Nos. 18 to 36	dis 72-10 @ 75-10
Stone Br. & Ann'd. Nos. 37 to 36	dis 72-10 @ 75-10
Stone, Tin'd. Tin'd List, Nos. 18 to 36	dis 70-10 @ 75
Tinned Broom Wire, Nos. 18 to 36	dis 72-10 @ 75
Galvanized Fence	dis 65 @ 65-10
Annealed Fence, Nos. 8 & 9	dis 70 @ 75-10
Annealed Wraps, Nos. 10 to 18	dis 70 @ 75-10
Copper, list Jan. 18, 1884	dis 20
Copper, list Jan. 18, 1884	dis 20 @ 25
Barb Fence	See Trade Reports
Wire on Spools	dis 55
Mallin's Steel and Tinned Wire on Spools	dis 40
Mallin's Brass and Copper Wire on Spools	dis 30
Cast Steel Wire	dis 30
Steel Music Wire	dis 30
Steel Music Wire, Nos. 18 to 30	dis 30
Picture Wire	dis 60-10
Barb Wire Safety Guards	dis 1000 \$2.00, dis 25
Wire Clothes Lines. See Lines.	
Wire Cloth, Netting, &c.	
Painted Screen Cloth, No. 34, 100 sq. ft.	\$1.90
Painted Screen Cloth, No. 35, 100 sq. ft.	\$2.00
Galvanized Wire Netting	dis 70-10 @ 75
Wire Goods.—See Bright Wire Goods.	
Wire Rope.—List May 1, 1885	dis 33
Wrenches.—American Adjustable	dis 45
Baxter's Adjustable "S"	dis 40-10 @ 50
Baxter's Diagonal	dis 40-10 @ 50
Co's "Mechanics"	dis 55-10 @ 60

CURRENT METAL PRICES.

AUGUST 22, 1888.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market reports.

IRON AND STEEL.

Bar Iron from Store.

Common Iron:	
3/4 to 2 in. round and square.	1/2 lb 1.90 @ 2.00¢
1 to 6 in. x 3/4 to 1 in.	
Refined Iron:	
3/4 to 2 in. round and square.	1/2 lb 2.10 @ 2.25¢
1 to 4 in. x 3/4 to 1 1/4 in.	
4 1/2 to 6 in. x 3/4 to 1 in.	1/2 lb 2.30 @ 2.45¢
1 to 6 in. x 1 1/4 and 5-16	1/2 lb 2.30 @ 2.45¢
Rods—5/8 and 1 1/8 round and sq.	1/2 lb 2.30 @ 2.45¢
Bands—1 to 6 x 3-16 to No. 12.	1/2 lb 2.30 @ 2.45¢
"Burden Best" Iron, base price.	1/2 lb 3.00 @ ...
Burden's "H. B. & S." Iron, base price.	1/2 lb 2.80 @ ...
"Ulster"	1/2 lb 3.10 @ ...
Norway Rods	4.00 @ 5.00¢

Merchant Steel from Store.

Open-Hearth and Bessemer Machinery.	Per pound.
Toe Calk, Tire and Sleigh Shoe, base price in small lots.	3 1/4¢ @ 3¢
Best Cast Steel, base price in small lots.	5 1/4¢ @ 5¢
Best Cast Steel Machinery, base price in small lots.	3 1/4¢ @ 6¢

For Classification and Extras adopted by the Merchant Steel Association of the United States, June 1, 1888, see *The Iron Age*, June 21, 1888.

Sheet Iron from Store.

Common American.	R. G. Cleaned.
10 to 16	1/2 lb 2.75 @ 2.80¢
17 to 20	1/2 lb 2.85 @ 3.00¢
21 to 24	1/2 lb 3.00 @ 3.10¢
25 and 26	1/2 lb 3.20 @ 3.50¢
27	1/2 lb 3.35 @ 3.75¢
28	1/2 lb 3.50 @ 4.00¢
B. R.	2d qual.
Galv'd, 14 to 20.	1/2 lb 4.50 @ 4.88¢
Galv'd, 1 to 24.	1/2 lb 4.87 1/2 @ 4.75¢
Galv'd, 25 to 26.	1/2 lb 5.25 @ 5.12¢
Galv'd, 27	1/2 lb 5.62 1/2 @ 5.48¢
Galv'd, 28	1/2 lb 6.00 @ 5.85¢
Patent Platinized	1/2 lb A 10¢ B, 9¢
Russia	1/2 lb 9 1/4¢ @ 10¢
American Cold Rolled B. B.	1/2 lb 5¢ @ 7¢

English Steel from Store.

Best Cast	1/2 lb 15¢
Extra Cast	1/2 lb 16 1/2¢
Swaged Cast	1/2 lb 16¢
Best Double Shear	1/2 lb 15¢
Bilster, 1st quality	1/2 lb 12 1/2¢
German Steel, Best	1/2 lb 10¢
3d quality	1/2 lb 9¢
8d quality	1/2 lb 8¢
Sheet Cast Steel, 1st quality	1/2 lb 15¢
2d quality	1/2 lb 14¢
8d quality	1/2 lb 12 1/2¢

METALS.

Tin.

Banca, Pigs	Per lb 24¢
Straits, Pigs	24¢
English, Pigs	24¢
Straits in Bars	25¢

Tin Plates.

Charcoal Plates.—Bright.

Melyn Grade.	IC 10 x 14	\$5.75 @ \$6.00
"	IC 12 x 13	6.40 @ 6.25
"	IC 14 x 20	6.75 @ 6.00
"	IC 20 x 28	12.25 @ 12.10
"	IX 10 x 14	7.25 @ 7.50
"	IX 12 x 12	7.50 @ 7.75
"	IX 14 x 20	7.25 @ 7.50
"	IX 20 x 28	15.25 @ 15.50
"	DC 12 1/2 x 17	5.50 @ 5.75
"	DX 12 1/2 x 17	7.00 @ 7.25
Calland Grade.	IC 10 x 14	\$6.00
"	IC 12 x 13	6.25
"	IC 14 x 20	6.00
"	IX 10 x 14	7.50
"	IX 12 x 12	7.75
"	IX 14 x 20	7.50
Allaway Grade.	IC 10 x 14	\$5.25 @
"	IC 12 x 13	5.50 @
"	IC 14 x 20	5.25 @
"	IC 20 x 28	10.75 @
"	IX 10 x 14	6.25 @
"	IX 12 x 12	6.50 @
"	IX 14 x 20	6.25 @
"	IX 20 x 28	12.50
"	DC 12 1/2 x 17	5.00 @
"	DX 12 1/2 x 17	6.00 @

Coke Plates.—Bright.

Steel Coke.—IC 10 x 14, 14 x 20	\$4.80 @
" 10 x 20	7.50 @ 7.65
" 20 x 28	10.00 @ 10.15
IX 10 x 14, 14 x 20	5.65
BV Grade.—IC 10 x 14, 14 x 20	4.70 @

Charcoal Plates.—Terne.

Dean Grade.—IC 14 x 20	\$4.62 1/2 @
" 20 x 28	9.25 @
IX 14 x 20	5.62 1/2 @
" 20 x 28	11.31 1/2 @

Abecarne Grade.—IC 14 x 20	4.50 @
" 20 x 28	9.00 @
IX 14 x 20	5.50 @
" 20 x 28	10.80

Tin Boiler Plates.

IXX 14 x 26	112 sheets. \$12.50 @ \$12.75
IXX 14 x 28	112 sheets. 12.75 @
IXX 14 x 31	112 sheets. 14.25 @

Copper.

Duty: Pig. (Bar and Logot, 4¢; Old Copper, 3¢ 1/2 lb. Manufactured (including all articles of which Copper is a component of chief value), 4 1/2 ad valorem.	
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Ingot.

Lake	@ 17.50¢
"Anchor" Brand	@ 17¢

Sheet and Bolt.

Prices adopted by the Association of Copper Manufacturers of the United States, December 10, 1887, being quotations for all sized lots.

Not wider than	Not longer than	And longer than	Weights per square foot and prices per pound.							
			Over 64 oz.	32 to 64 oz.	16 to 32 oz.	14 to 16 oz.	12 to 14 oz.	10 to 12 oz.	8 to 10 oz.	Less than 8 oz.
30	72		25	25	25	26	27	28	31	33
30	96	72	25	25	25	26	28	30	34	
36	96		25	25	25	27	29	33	36	
48	96	96	25	25	26	28	30	34	38	
48	96		25	25	27	29	31	35		
60	96	96	25	25	28	30	32	36		
60	96		25	25	30	32	37			
84	96		26	27						
84	96		27	28						
Over 84 in. wide			28	30						

All Bath Tub Sheets..... 16 oz. 14 oz. 12 oz. 10 oz.
Per pound..... \$0.28 0.30 0.32 0.35
Bolt Copper, 3/4 inch diameter and over, per pound..... 25¢

Circles, 60 inches in diameter and less, 3 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles, over 60 inches diameter, up to 96 inches diameter, inclusive, 5 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles, over 96 inches diameter, 6 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Segment and Pattern Sheets, 3 cents per pound advance over price of sheets required to cut them from.

Cold or Hard Rolled Copper, 14 ounces per square foot and heavier, 1 cent per pound over the foregoing prices.

Cold or Hard Rolled Copper, lighter than 14 ounces per square foot, 2 cents per pound over the foregoing prices.

Copper Bottoms, Pits and Flats.

14 ounce to square foot and heavier

12 ounce and up to 14 ounce to square foot

10 ounce and up to 12 ounce

Circles less than 8 inches diameter 2 cents per pound additional.

Circles over 13 inches diameter are not classed as Copper Bottoms.

Tinning.

Tinning sheets on one side, 10, 12 and 14 x 48 each

Tinning sheets on one side, 30 x 60 each

For tinning boiler sizes, 9 in (sheets 14 in. x 60 in.), each

For tinning boiler sizes, 8 in (sheets 14 in. x 56 in.), each

For tinning boiler sizes, 7 in (sheets 14 in. x 52 in.) each

Tinning sheets on one side, other sizes, per square foot

For tinning both sides double the above prices.

Planished Copper.

Planished Copper List May 5, 1888

Brass and Copper Tubes.

Seamless Copper. 3/4 inch 1/2 lb. 50¢ 1/2 inch 1/2 lb. 47¢

1 1/4 inch 1/2 lb. 44¢ 1 1/2 inch 1/2 lb. 41¢

2 inch 1/2 lb. 42¢ 2 1/2 inch 1/2 lb. 39¢

3 inch 1/2 lb. 40¢ 3 1/2 inch 1/2 lb. 37¢

4 inch 1/2 lb. 39¢ 4 1/2 inch 1/2 lb. 36¢

5 inch 1/2 lb. 37¢ 5 1/2 inch 1/2 lb. 34¢

6 inch 1/2 lb. 34¢ 6 1/2 inch 1/2 lb. 31¢

Roll and Sheet Brass.

Discount from list. 10 @ 15 %

Spelter.

Duty: Pig. Bars and Plates, \$1.50 @ 100 lb. Western Spelter

"Berz report"

"Bertha"

Zinc.

Duty: Sheet, 2 1/4¢ @ lb. 600 lb casks

Lead.

Duty: Pig. \$2 @ 100 lb. Old Lead, 2¢ @ lb. Pipe and Sheets, 3¢ @ lb. American

Newark

Bar

Pipe, subject to trade discount

Tin-lined Pipe, subject to trade discount

Block Tin Pipes, subject to trade discount

Sheet, subject to trade discount

Solder.

1/2 @ 1/2 (Guaranteed)

Extra Wiping

The prices of the many other qualities of Solder in the market indicated by private brands vary according to composition.

Antimony.

Cookson

Hallett's

Plumbers' Brass Work.

Discount per cent.

Ground Bibbs and Stops

Ground Stops, Hydrant Cocks, &c.

Corporation Cocks

Corporation Cocks, "Mueller" Pattern, from Western list

Ground Basin and Shampooing Cocks

Compression Basin Cocks

Compression Basin and Sink Cocks

Compression Pantry Cocks

Compression Double Basin and Shampooing Cocks

Compression Double Bath Cocks

Compression Bibbs, Urinal Cocks, Still Cocks, Stops, Hopper Cocks, Hydrant Cocks and Ball Cocks

Basin Plugs and Basin Grates

Bath and Wash Tray Plugs

Bath Wastes and Washers, Bath and Basin Valves, Sewer and Vacuum Valves, Cistern Valves, Pump Valves and Strainers, Ship Closet Valves and Suction Baskets

Basin Clamps, Basin Joints and Strainers

Boiler Couplings, Ground Face, per set \$1.25

Boiler Couplings, Plain Face, per set \$1.30

Water Back Valve and Plain Couplings, Soldering Nipples and Unions

Union Joints

Hydrant Nozzles, Handles and Guides, Sockets and Clamps, Street Washer Screws and Guides

Hose Goods

Steam and Gas Fitters' Brass and Iron Work.

Discount per cent.

Brass Globe Valves

Finished Brass Globe Valves, with Finished Brass Wheels

Brass Globe Valves, with Patent Wood Wheels

Brass Globe Angle and Corner Valves

Brass Radiator Angle Valves

Brass Radiator Angle Valves, Frink's Patent

Brass Cross and Check Valves

Brass Check Valves

Brass Hose Valves

Brass and Iron Frink Valves

Brass Safety Valves

Brass Vacuum Valves

Brass Whistle Valves

Brass Balance, Back Pressure and Foot Valves

Brass Butterfly and Throttle Valves

Brass Pump Valves

Brass Steam Cocks

Brass Service, Meter and Union Meter Cocks

Brass Whistles, Water Gauges and Oil Cups

Brass Hollow Plug, Tallow and Globe Oil Cups

Brass Lubricators

Brass Air Valves

Brass Air Cocks

Brass Gauge Cocks

Brass Cylinder Cocks and Steam Bibbs

Brass Swing Joints and Expansion Joints

Brass Test Pumps

Brass Steam Fittings, Rough

Brass Steam Fittings, Finished

Brass Union Joints

Brass Soldering Unions and Nipples

Brass Hose Fittings, Fusible and Boiler Plugs

Iron Body Globe, Angle, Cross and Check Valves

Iron Body Safety, Throttle, Back Pressure, Butterfly and Foot Valves

Iron Cocks, all Iron

All Iron Valves

Miscellaneous.

Discount per cent.

Cast Iron Fittings

Plugs and Bushings

Malleable Iron Unions

Malleable Iron Fittings

Paints.

Black, Lamp—Coach Painters'

" Ordinary

Black, Ivory Drop, fair

" best

Black Paint, in oil

Blue, Prussian, fair to best

" " in oil

" Chinese dry

" Ultramarine

Brown, Spanish

THE IRON AGE

THURSDAY, AUGUST 30, 1888.

The Ericsson Sun Motor.

In view of the attention which the application of solar heat to motive power purposes has recently received in France, a contribution which the distinguished engineer, Capt. John Ericsson has just made to *Nature* will be read with special interest. It relates to his sun motor, to which he has given a good deal of time and attention within the past few years, and through his courtesy we are enabled to present engravings of it this week, together with his description.

India, South America and other countries, says Captain Ericsson, interested in the employment of sun-power for mechanical purposes, have watched with great attention the result of recent experiments in France, conducted by M. Tellier, whose plan of actuating motive engines by the

piston of the motive engine: Fig. 1 represents a perspective view of a cylindrical heater and a frame supporting a series of reflecting mirrors composed of narrow strips of window glass coated with silver on the under side. The frame consists of a light structure of wrought iron or steel, provided with transverse ribs, as shown by the illustration, each rib being accurately bent to a parabolic curvature whose focus coincides with the axis of the cylindrical heater. It need hardly be stated that the mirrors supported by the said transverse ribs continue from side to side of the frame, which accordingly resembles a parabolic trough whose bottom is composed of mirrors. It will be readily understood that this trough, with its bent ribs and flat mirrors, forms a perfect parabolic reflector, to which a cylindrical heater, as stated, may be attached for gen-

which Tellier's apparatus, tested at Paris, was intended to displace.

DESCRIPTION OF THE ILLUSTRATED REFLECTOR.

1. The mirrors which reflect the solar rays are devoid of curvature, being flat narrow strips of ordinary window glass, cut to uniform width and length, perfectly straight.

2. The under sides of said strips are coated with silver by a process which prevents the action of the sun's rays from destroying the silver coating as in ordinary looking glasses.

3. The mirrors supported by the bent metallic ribs extending from side to side of the parabolic trough are held down by the heads of small screws tapped into the ribs. Thin slats of wood may be introduced between the mirrors and the ribs—

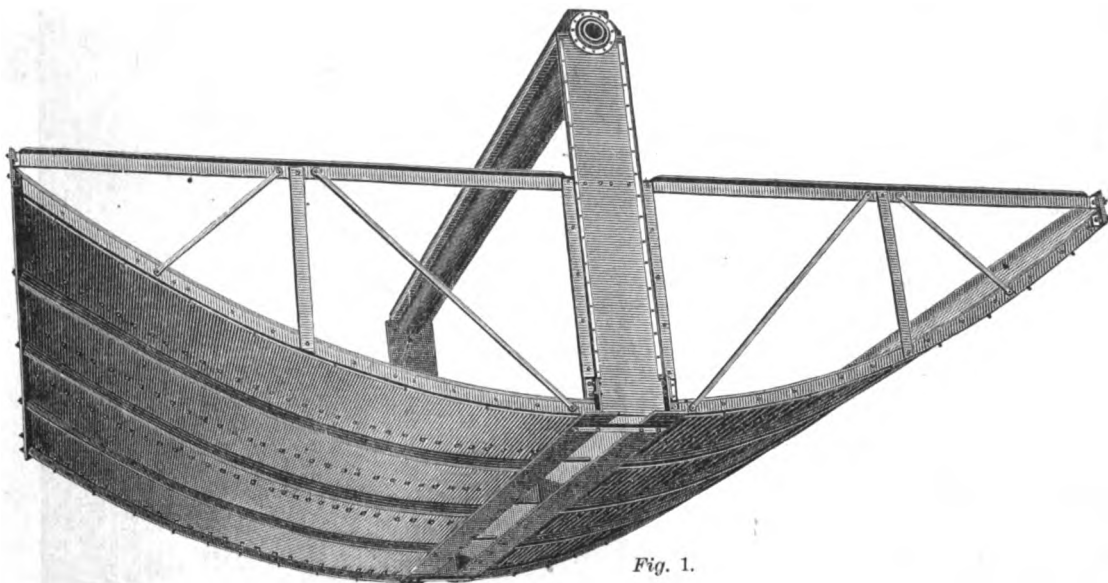


Fig. 1.

THE ERICSSON SUN MOTOR.

direct application of solar heat has been supposed to be more advantageous than the plan adopted by the writer of increasing the intensity of the solar rays by a series of reflecting mirrors. The published statements that "the heat-absorbing surface" of the French apparatus presents an area of 215 square feet to the action of the sun's rays, and that "the work done has been only 43,360 foot-pounds per hour," furnish data proving that Tellier's invention possesses no practical value.

The results of protracted experiments with my sun motor, provided with reflecting mirrors, as stated, have established the fact that a surface of 100 square feet presented at right angles to the sun at noon in the latitude of New York during summer develops a mechanical energy reaching 1,850,000 foot-pounds per hour. The advocates of the French system of dispensing with the "cumbrous mirrors" will do well to compare the said amount with the insignificant mechanical energy represented by 43,360 foot-pounds per hour developed by 215 square feet of surface exposed to the sun by Tellier during his experiments in Paris.

The following brief description will give a clear idea of the nature and arrangement of the reflecting mirrors adopted by the writer for increasing the intensity of the solar heat which imparts expansive force to the medium propelling the working

erating steam or expanding the gases intended to actuate the piston of the motive engine. Regarding the mechanism for turning the reflector toward the sun, engineers are aware that various combinations, based on the principle of the "universal joint" may be employed.

Concerning previous attempts made in France to utilize solar energy for mechanical purposes, it is well known that practical engineers, having critically examined Mouchot's solar engine, which M. Tellier proposes to supersede, find that it is incapable of developing sufficient power for any domestic purpose. Again, the investigations carried out by order of the French Government, to ascertain the merits of Mouchot's invention, show that irrespective of the great expense of silver-lined curved metallic reflectors for increasing the insufficient energy of direct solar radiation, these reflectors cannot be made on a sufficient scale for motors having adequate power to meet the demands of commerce; nor is it possible to overcome the difficulty of rapid wear of the delicate silver lining of the metallic reflectors consequent on atmospheric influence, which after a few hours of exposure renders their surfaces tarnished and ineffective unless continually polished. A glance at the accompanying illustration (Fig. 1) shows that the reflector constructed for my sun motor differs altogether from that originated by Mouchot,

an expedient of some importance in localities where the reflector is exposed to high winds.

4. It needs no explanation that the reflecting surface of the mirrors cannot become tarnished by atmospheric influence, since the bright side of the silver coating is permanently protected by the glass; hence it will be only necessary to remove dust from the mirrors, an operation readily performed by feather brushes secured to light handles of suitable length.

5. The frame of the reflector, being composed of rolled bars of iron or steel, requires no finish, excepting the top of the transverse ribs, which must correspond accurately with a given parabolic curvature. It should be observed that the needed accuracy is readily attained by a cutting tool guided by a bar of proper form.

6. Regarding cost of construction it will suffice to state that manufacturers of glass, both in the United States and Germany, supply the mirrors, cut to exact size and silvered, at a rate of 60 cents per square foot, the weight being 106 pounds per 100 square feet. Consequently the cost of the reflector and heater for the sun motor will not much exceed that of a steam boiler and appurtenances, including chimney. The cost of the engine, apart from the reflector, will not be greater than that of an ordinary steam engine.

7. With reference to durability it will be evident that the light metallic frame with its mirrors, and a heater acted upon only by reflected solar heat, will last much longer than steam boilers subjected to the action of fire, soot and corrosion.

Let us now briefly consider the distinguishing feature of the sun motor—namely, the increase of the intensity of the sun's radiant energy by parallel rays and flat reflecting surfaces permanently protected against atmospheric influence. It has been supposed that the lens and the curved reflecting surface, by converging the sun's rays, could alone increase the intensity of radiant heat. But Newton's demonstration, showing that the temperature produced by solar radiation is "as the density of the rays," taught me to adopt in place of curved surfaces and converging rays, flat surfaces and parallel rays, as shown by Fig. 2, which represents a transverse section of part of the reflector. The direct vertical solar rays, it will be seen, act on the mirrors, while the reflected rays, divided into diagonal clusters of parallel rays, act on the heater, the surface of which will thus be exposed to a dense mass of reflected rays, and consequently raised to a temperature exceeding 600° F. at noon during ordinary sunshine.

The cost, durability and mechanical energy of the sun motor being thus disposed of, it remains to be shown whether the developed energy is continuous or whether the power of the engine changes with the increase and diminution of zenith distance and consequent variation of atmospheric absorption. Evidently, an accurate knowledge of the diathermancy of terrestrial atmosphere is indispensable to determine whether the variation of the radiant energy is so great that the development of constant power becomes impracticable. Of course, manufacture and commerce demand a motor developing *full power* during a modern working day of *eight hours*. Observations relating to atmospheric diathermancy, continued during a series of years, enable me to assert that the augmentation of solar intensity during the middle of the day is so moderate that, by adopting the simple expedient of wasting a certain amount of the superabundant heat generated while the sun is near the meridian (as the steam engineer relieves the excess of pressure by opening the safety valve), a uniform working power will be developed during the stipulated eight hours. The opening of the safety valve, however, means waste of coal raised from a great depth at great cost, possibly transported a long distance, while the radiant heat wasted automatically by the sun motor is produced by fuel obtained from an inexhaustible storehouse free of cost and transportation.

It will be proper to mention that the successful trial of the sun motor, described and illustrated in *Nature*, vol. xxxi. p. 217, attracted the special attention of landowners on the Pacific coast then in search of power for actuating the machinery needed for irrigating their sun-burnt lands. But the mechanical detail connected with the concentration at a single point of the power developed by a series of reflectors was not perfected at the time; nor was the investigation relating to atmospheric diathermancy sufficiently advanced to determine with precision the retardation of the radiant heat caused by increased zenith distance. Consequently no contracts for building sun motors could then be entered into, a circumstance which greatly discouraged the enterprising Californian agriculturists prepared to carry out forthwith an extensive system of irrigation. In the meantime a simple method of concentrating the power of many reflectors at a given point has been perfected, while the retardation of solar energy caused by

increased zenith distance has been accurately determined, and found to be so inconsiderable that it does not interfere with the development of constant solar power during the eight hours called for.

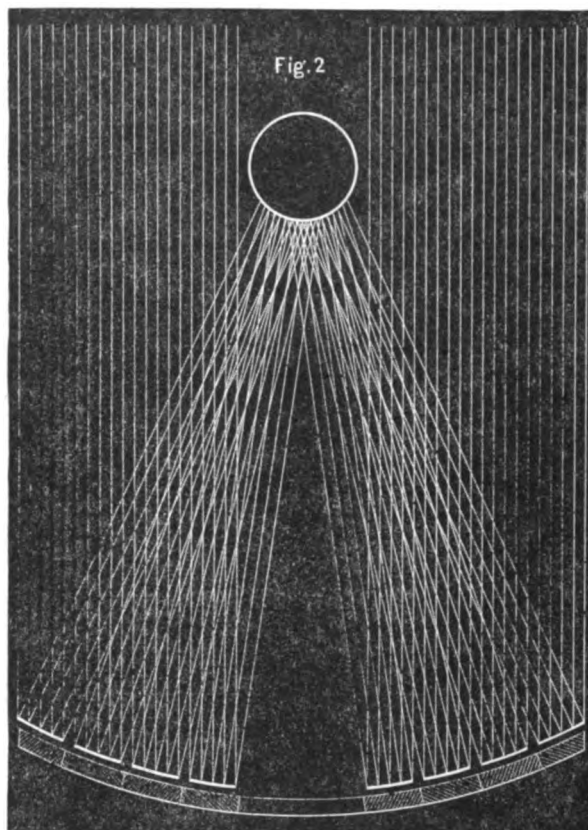
The new motor being thus perfected, and first-class manufacturing establishments ready to manufacture such machines, owners of the sun-burnt lands on the Pacific coast may now with propriety reconsider their grand scheme of irrigation by means of sun power.

Domestic Motive-Power by Atmospheric Exhaustion.

The system of power distribution by creating a partial vacuum in the supply mains, as developed in Paris, France, has

causing a slight draft, which aids the pump. Water is injected into the cylinder to obviate the rise of temperature which would otherwise occur from the compression of the rarefied air to atmospheric pressure. The pump is worked by direct connection with a horizontal Corliss condensing steam engine of 90 horsepower, making 36 turns per minute, and working with an initial steam pressure of 4½ atmospheres, cutting off at one-fifth. The efficiency of the pump is estimated at 98 per cent. of the power transmitted. The maximum demand for power, supposing all the motors to be at work at the same time, is 35 horse-power.

It can be proved that, with a perfect machine, 1 c. m. of air entering the main produces 13,530 kg. of work. In practice the air cylinder utilizes 93 per cent. of the



THE ERICSSON SUN MOTOR.

been referred to in *The Iron Age* several times since operations in connection with it were first commenced. In the last issue of the *Excerpt Minutes* of the proceedings of the British Institution of Civil Engineers, however, we find additional particulars originally contributed to the *Bulletin* of the Société Industrielle de Mulhouse by M. E. Dollfus. From these we take the following:

The principle consists in maintaining a vacuum, averaging 67 per cent., or 20 inches of mercury, but occasionally reaching to 75 per cent., or 22½ inches, in a reservoir serving to regulate the pressure in the pipes. The air-pump, an ordinary compressor working reversely, consists of a cast-iron cylinder, on the ends of which the suction-valves and discharge-valves are mounted. The piston, also of cast-iron, is formed with several grooves in the circumference, the two outer grooves being fitted with india-rubber rings. These rings are pressed against the cylinder by air passing through the piston. The valves are of india-rubber. The exhaust reservoir is 49 inches in diameter, 11½ feet in length. The air is discharged into a sheet-iron chimney, by which it is

power transmitted; of this proportion the exhaust motors in turn give a maximum of 60 per cent.; the loss of head in the main is 5 per cent.; lastly, the air yields only 85 per cent. of its total capacity for work. The resulting coefficient is 45 per cent., and the actual work of 1 c. m. of air is $13,530 \times 0.45 = 6088$ kg. (44,034 foot-pounds). From the exhausted reservoir a main is laid in the sewers or in trenches, and is provided with as many branches as necessary. A junction is made with the pipes for each subscriber, who is furnished with a special stop-cock.

The principal pipes are of cast iron, in lengths of 1 m., and of varying diameter, 10 inches and 8 inches from the pumping station to the sewer, and 8 inches and 4 inches in the sewer or trench. They are from 0.25 inch to 0.40 inch in thickness. The joints of the pipes are run with lead against an india-rubber ring, and calked in the usual way. The conduits do not exceed from 1 mile to 1½ miles in length. Greater lengths than these induce very sensible losses of head; hence the necessity for creating a series of centers. Condensation water in the pipes is not provided against, as the water carried by the atmospheric air vaporizes under the low pres-

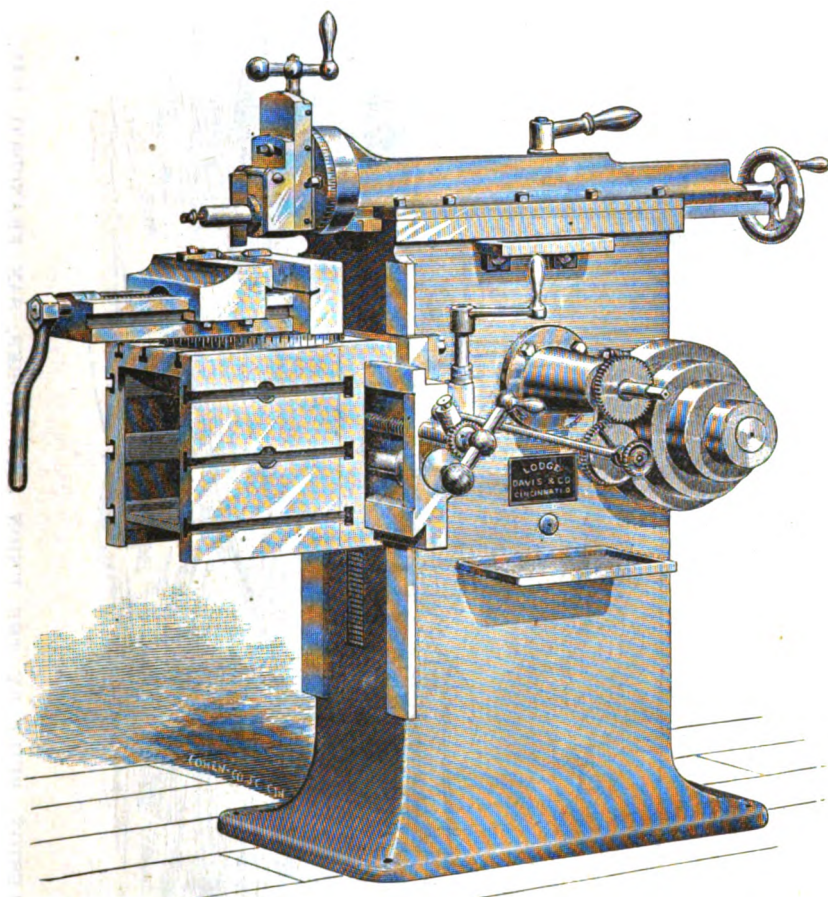
ure. But, on the other hand, the air, in entering the conduit, expands rapidly and falls in temperature, when the entering moisture may freeze and clog the motors. For such a contingency the company decline responsibility.

By the secondary motors the pressure of the air is converted into work at once utilizable by the operator. Motors of three types have been employed—oscillating, rotative and trunk. The first has fallen into disuse, in consequence of waste by leakages. The operator simply turns a tap to start the engine, no further attention being necessary while his motor is at work. The rotative motor is specially constructed for small powers of from $\frac{1}{2}$ to $\frac{1}{4}$ horse-power. The trunk engine is employed for powers of from $\frac{1}{4}$ to 1 horse-

power varies from 0.114 cent to 1.32 cents per 1000 revolutions, or from 1.77 cents to 10 cents per hour. The hygienic advantage of the exhaustion motor in promoting ventilation is obvious.

New 15-Inch Shaper.

We show on this page a new 15-inch shaper, built by Messrs. Lodge, Davis & Co., of Cincinnati, Ohio. The stroke of the tool can be changed and adjusted while running. When the end of the ram is at the end of motion of 15 inches it has a bearing in the column slide of 21 $\frac{1}{4}$ inches. Being operated by a crank motion, the stroke of the shaper is at all times positive, and it will invariably plane to a line,



NEW 15-INCH SHAPER, BUILT BY LODGE, DAVIS & COMPANY, CINCINNATI, OHIO.

power. The efficiency of the motors varies from 40 per cent. to 60 per cent., according to the size of motor used. The number of revolutions of each motor is registered by a counter, in which a roller turns in contact with a friction-plate, at a greater or less radial distance from the center of the plate, according to the pressure developed. Thus the variation of pressure is compensated for by the registering of a greater number of turns relatively as the pressure is augmented and a less number as it is reduced.

The economy effected by the use of these domestic motors is exemplified by the case of a brush-maker, who works a saw and five drilling lathes. Now, with a $\frac{1}{4}$ horse-power motor, five men do the work of eight employed previously, and the expenditure is about 60 cents per day for the motor-power, against about \$3 for three men. In another case, that of the manufacture of tortoise-shell combs, two lathes are employed, to drive which a man was formerly paid \$1 per day of ten hours. Now, with a motor, the cost for power is only 50 cents per day. The charge for power of from $\frac{1}{2}$ horse-power to 1 horse-

making it a particularly desirable tool for diemakers where accurate work is required. The vise is swiveled, and may be transferred from the top of the table to the side, adapting the machine to a larger range of work. The vise opens 8 inches, is 2 inches deep and 10 inches wide. With each machine is furnished an improved box table. Work can be bolted on the top and both sides. Being made in this form it has in addition a degree of stiffness not possessed by one-sided tables. It can also be utilized as a receptacle for tools, &c. The table may be removed and the work bolted to the slotted apron to which the box table is attached. This is desirable in planing the tops and sides of heavy pieces, such as legs of machines, &c. The machine is heavily geared, giving great power with high-belt velocity. The gears are well proportioned, and are cut from the solid; the machine has a vertical adjustment of 18 inches, and a cross motion of 18 inches. The tool block has 5 inches feed in any direction. All the bearings are accurately scraped to a fit. The machine has four changes of speed, and weighs 1500 pounds.

Solid Drawn Copper Tubes.

At the Glasgow Exhibition the Tharsis Sulphur and Copper Company exhibited cylindrical copper billets used for making solid drawn tubes by a process invented by Mr. James Robertson. These billets are usually about 30 inches long and from 4 inches to 7 inches diameter. *Industries* describes the process as follows:

In practice, a hole 1 $\frac{1}{4}$ diameter is bored right through the billet by drills from either end. The billet is then lightly skinned in a lathe to clean the surface, after which it is inclosed in a cast-steel container made in halves and bored out to suit the particular size of billet. This container rests on a stout bed plate, and remains stationary while a pear-shaped mandrel attached to a revolving hydraulic ram is entered at one end of the hole in the billet. A flexible tube inserted in the other end of the hole supplies lubricant. On pressure being applied to the revolving ram which carries the mandrel, the metal of the billet gradually flows back in the container, in front of the mandrel, and in a few minutes the mandrel pierces the elongated billet, leaving a shell having the original outside diameter, but with a hole corresponding to the size of the mandrel. A sample cut in halves shows the operation partially completed. After annealing, this shell is ready for drawing hot in rolls, or cold in the usual draw benches. The temperature of the shell or mandrel never exceeds 120° F., and the only waste occurring in the process is the 1 $\frac{1}{4}$ -inch hole through the center of the billet, and the surface cleaning. This hole, however, is only a convenience and is not an essential, for very frequently tubes are pierced out of the solid, it being only a question of a little more power and a somewhat longer time.

Oval billets are produced for another process of making solid drawn copper tubes, and measure 24 inches by 10 $\frac{1}{4}$ inches by 2 $\frac{1}{4}$ inches thick, which are rolled hot in the direction of the shortest diameter till they become circular disks about 30 inches diameter. By means of suitable dies and mandrels in a hydraulic press, and after annealing, these disks are cold worked successively into basins, conical domes, and ultimately into parallel tubes having one end closed. On punching out this closed end, a shell about 5 feet long remains for finishing on the draw benches, and, with the exception of the closed end, all the metal of the original oval cake is in the shell.

The Navy Department has invited proposals for the construction of one steel submarine torpedo boat complete, with torpedo fittings and appendages. The vessel is to be of the best and most modern design, and, so says the circular, must be constructed within the United States and of material of domestic manufacture. Bids will be received until January 4 next. Some time ago Messrs. Cramp & Sons made two propositions for the construction of a vessel of this description, but they were rejected because of failure to guarantee its serviceableness.

The trunk manufacturing interest of Louisville, Ky., is larger in the aggregate than at any other point in this country except Newark, N. J., and is principally carried on by three factories. To give an idea of the rapid growth of this industry: the firm of Laub, Stromberg and Kraus began work five years ago in an attic, or loft, employing five men altogether. To-day they have on their pay-roll 100 workmen, have a factory four stories high and covering about 200 x 400 feet of ground. Their orders are so numerous that they cannot take any more, and have called in their salesmen. Their trade extends all over this country and into Mexico.

The Cruiser Charleston.

In this issue we publish engravings of the first of the new cruisers, the Charleston, which was launched on the Pacific Coast a few weeks ago, the builders being the Union Iron Works, of San Francisco, Cal. Though we briefly described the vessel at the time, some of the particulars will bear repetition.

The Charleston has a central open superstructure, twin screws and two masts with military tops in which machine guns are mounted. She was built upon the plans of the swift Japanese cruiser Naniwa-Kan, built by Sir G. W. Armstrong, with such modifications as were rendered necessary by the conditions of the United States service and the substitution of 8-inch for 10-inch guns. The principal dimensions of the vessel are: Length over all, 320 feet; length on load line, 300 feet; breadth, 46 feet; mean draft, 18 feet 6 inches; displacement to mean load line, 3730. The indicated horse-power, with natural draft, is 5000; with forced draft, 7500. The maximum speed per hour is 18.9 knots. The crew will number 325 men. The vessel is double bottomed under engines and boilers. She has also a curved or turtle-back steel deck from 2 to 3 inches thick running from stem to stern and protecting everything below it, being a foot above load-water line at the crown and then sloping at its edges to 4 feet below the water. The coal bunkers are so arranged as to furnish further protection.

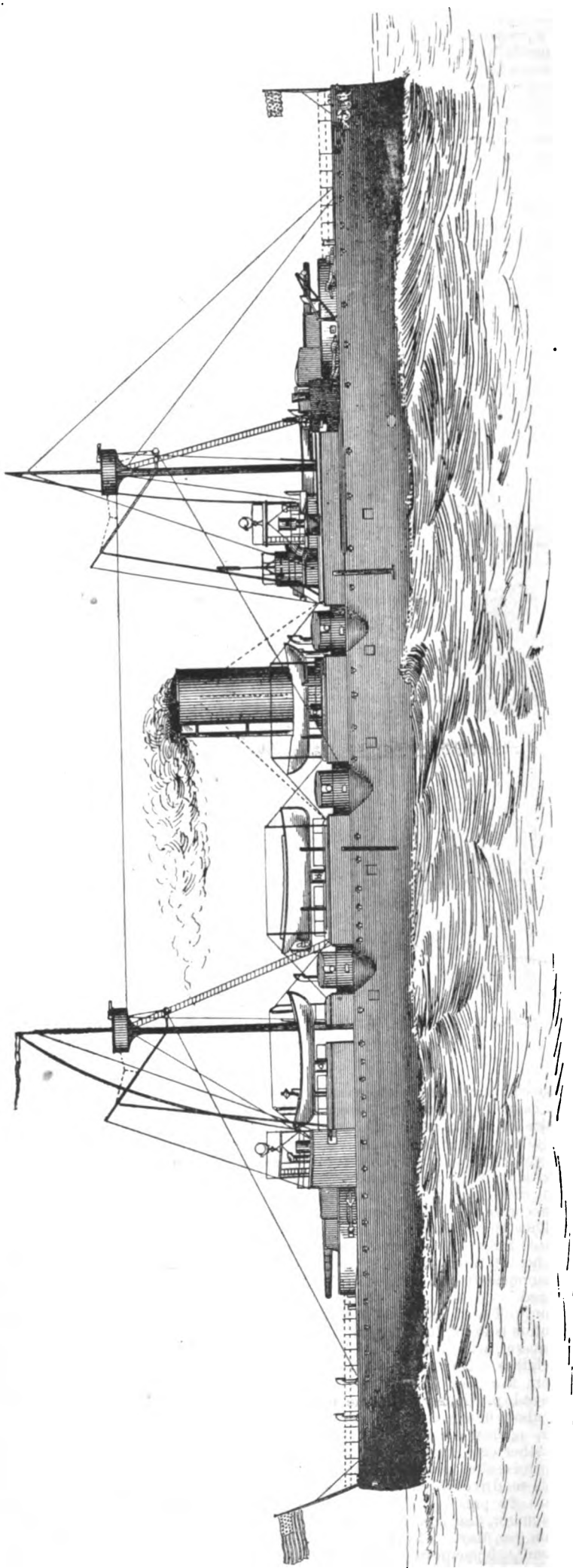
A chart and wheel house is built under the bridge, containing steering wheels, engine telegraphs, steering lever, indicators, speaking tubes to the conning tower and other parts of the vessel, folding chart-table, chart-lockers, telescope racks, &c. A conning tower is worked on the bridge. It is of mild steel, 2 inches thick on the vertical sides; the cover, $\frac{1}{4}$ inch. It is fitted with steering lever, engine telegraphs, indicator and speaking tubes. The floor has a grating for communication with the chart house.

Hydraulic steering gear is fitted to the vessel, with wheel or levers in the conning tower and chart house. The steering gear is placed under the protective deck, well below the water.

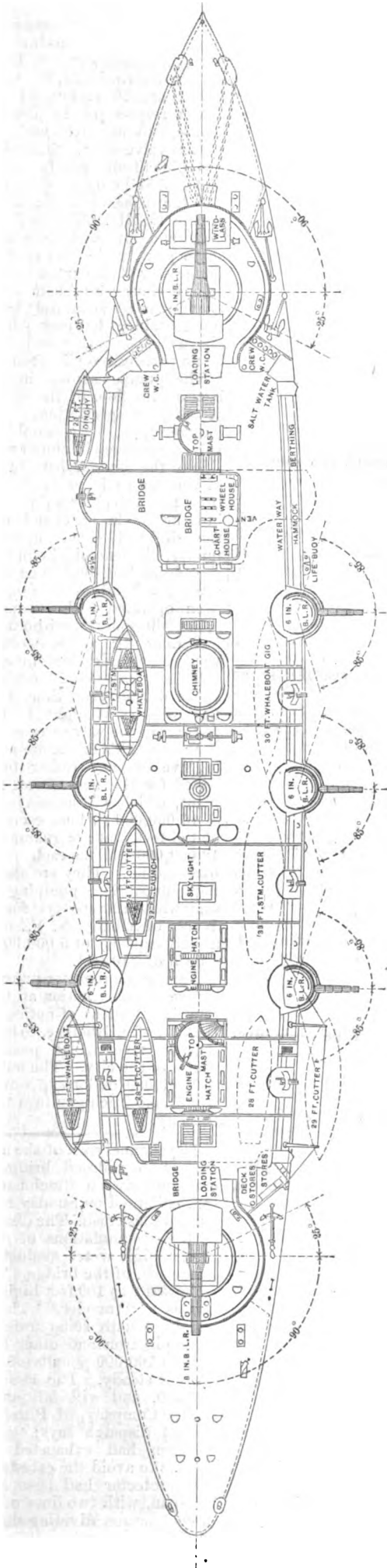
Two electric, incandescent, electric lighting plants are arranged to work on the same circuit, each capable of providing at least 3200 candle-power of light. The lamps are so placed as to fully light up all parts of the ship, including coal bunkers, magazines, shell and ammunition rooms, running lights and lights for use on deck and aloft. Provision is made for draining water from the storerooms, chain lockers, coal bunkers and all other compartments of the vessel to places from which the water can be pumped by hand or steam. The ventilation of the living and storage spaces is by the exhaust system, and while natural ventilation is used as far as possible, artificial exhausts are provided for all compartments below the spar deck by means of two blowers of 10,000 cubic feet capacity per minute. The foul air of the coal bunkers is led into the funnel casing, and the bunkers have fresh-air pipes with large mouths opening into the hammock berthing.

The horizontal plating of the protective deck is 2 inches thick, the sloping sides 3 inches.

The main battery consists of two 8-inch breech-loading rifles, mounted at each end of the superstructure in light barbettes about 3 feet high. Six 6-inch rifles are mounted on the same deck, three on a side, in projecting sponsons. The secondary battery consists of four 6 pounders, rapid-fire rifles, six Hotchkiss revolving cannon and four Gatlings. Four above-water torpedo guns or launching tubes are fitted. The motive power is furnished by two



THE U. S. CRUISER CHARLESTON, BUILT BY THE UNION IRON WORKS, SAN FRANCISCO, CAL.



The Main Deck.

horizontal compound engines placed in separate water-tight compartments and, as previously stated, developing 7500 indicated horse-power under forced draft. Each engine has a high and low pressure cylinder of 44 and 85 inches in diameter with a stroke of 36 inches. The crank shafts are a single forging of steel. The circulation and air pumps are worked by independent engines. The screws are three-bladed, about 14 feet in diameter. There are six main boilers in two separate water-tight compartments, all with one smoke-pipe. Those in the forward compartment are 11 feet in diameter, and in the after compartment, 11 feet 6 inches. Air is driven into each fire-room to maintain an air pressure of 2 inches of water. There will be a steam-starting and reversing gear, distilling apparatus, auxiliary bilge and fire pumps, ash-hoisting engines, a windlass for hoisting the anchor and for other heavy work, a steam winch for hoisting boats and light work generally, and steam turning gear for the main engines. The coal supply at normal draft is 328 tons, but the bunker capacity is 800 tons. The following table shows the endurance and radius of action at different speeds:

I. H. P.	Speed.	Coal per hour.	Distance can steam on 328 tons.	Distance can steam on 800 tons.	Coal per hour per I. H. P.
	Knots.	Tons.	Knots.	Knots.	Lbs.
7,650	18.9	7.51	805.14	2,012.85	2.2
6,000	17.5	5.62	995.75	2,491.12	2.1
5,000	16.5	4.46	1,183.71	2,959.60	2.0
2,750	13.0	2.45	1,897.93	4,244.89	2.0
1,200	10.0	1.07	2,990.60	7,476.60	2.0

Johnstown Freight Rates.

A few days ago the Baltimore and Ohio Railroad Company and the Pennsylvania Railroad Company entered into an agreement to make the same rates on iron from Johnstown, Pa., to points 100 miles from Pittsburgh as are in effect from Pittsburgh to these place. The new rates went into effect on Monday the 20th inst. The circular issued by the Baltimore and Ohio Railroad reads as follows: "Rates on articles of iron and steel manufacture, in full carloads, except on steel rails and fastenings, from Johnstown, Uniontown; Everson, Scottdale and Mt. Pleasant to all points west of Bellaire, will be the same as from Pittsburgh. The rates authorized in this tariff will also apply from stations between Johnstown and McKeesport, the latter not inclusive, and from stations between Mt. Pleasant and Uniontown." The tariff issued by the Pennsylvania Railroad Company is the same. In addition to the above taking effect at the same time, both roads reduced the rate on steel rails from Johnstown to Chicago from \$2.75 per gross ton to \$2.64, and from Pittsburgh to Chicago from \$2.50 to \$2.40. From this it will be seen that the advantage on steel rails to Western points is still in favor of the Pittsburgh manufacturers. Some of the Pittsburgh manufacturers complained that the railroads, by making the new rates on iron, were discriminating against Pittsburgh in favor of Johnstown, and they intimated that if the rates were not changed the matter would be taken before the Interstate Commissioners for settlement. The railroads, however, claim that they have not violated the Interstate law, since the law does no prohibit them from making the same rate for a long and short haul, but in no case are they allowed to make a lower rate for shorter than a longer one. The rates were made at the request of the Johnstown manufacturers. For points east of Johnstown the Pittsburgh manufacturers have been paying the same rates as the Johnstown manufacturers, and the new schedule was made in the endeavor to equalize the advantages of Pittsburgh over Johnstown on Eastern business.

The Cost of Machine Coal Mining.

Prof. H. A. Wheeler, of Washington University, St. Louis, has contributed to the *School of Mines Quarterly* an article on machine mining in the St. Louis coal regions, from which we take the following estimate of the cost of mining with the Harrison machine (Heavy Standard pattern) for a plant of about 400 tons daily capacity, which is about the usual size of the shipping mines in the Belleville district. In making up such an estimate as this, of course, only general figures can be given that will have an average value; local conditions will more or less modify these for any particular plant, while different seasons will cause considerable fluctuations in the principal daily expense, the labor item. Attention is called to one item of cost that is so very frequently omitted in engineers' estimates—viz., the pro rata that must be charged each year to return, as a sinking fund, the capital invested in the complete original outlay, besides the annual outlay in repairs that is required to keep this first investment in use. For not only must interest be charged against this cash investment (whether purchased through loans, mortgage or out of the cash capital), but the principal must be returned by the time the plant is worn out, which, in this case, is assumed to be at the expiration of ten years, except the machines, whose mean length of service is put at six years. The plant investment required to maintain such an output, for which eight machines will be necessary, is assumed to be as follows:

Plant Investment for an 8-Inch Machine Mine.

Compressor: 1 Compound Norwalk, 20 in. by 24 in. steam cylinder	\$3,000
Erection and housing of compressor	1,500
Air-Receivers: 1 main receiver, 4½ ft. by 12 ft.	\$380
Air-Receivers: 8 entry receivers, 1½ ft. by 6 ft. @ \$90	720
Piping: 500 ft. 5 in. shaft piping @ 54 cents	\$270
Piping: 2,000 ft. 3 in. main-entry piping @ 28 cents	560
Piping: 10,000 ft. 2 in. cross-entry piping @ 13 cents	1,300
Piping: 5,000 ft. 1½ in. room-piping @ 10½ cents	525
Total	\$2,855
Erection	885
Boilers: Two 50 horse-power boilers with complete fittings	2,000
Erection and housing of boilers	1,000
*10 Harrison Mining Machines, "Heavy Standard," including royalties, @ \$600	6,000
Hose: 8 pieces, 4-ply, rubber hose, 50 feet long, with couplings, @ \$40	320
Extra picks (8 @ \$5). Tools, &c.	800
Freight, incidental, &c.	1,286
Total	\$20,000

On this basis of an investment of \$20,000, which would be required to convert a hand mine into a machine mine (independent of all outlays for hoisting, pumping, ventilating and other machinery for general maintenance), the following estimate is made for the complete daily expenses of running a Harrison machine.

Running Expenses of a Machine per Day, with an 8-Machine Plant and 300 Working Days per Year.

	Cost.	Per cent. of whole.
Labor: 1 machine runner.. @ \$2.25		
1 machine helper..... @ 2.00		
1 blaster..... @ 2.25		
1 timberman..... @ 2.00		
4 loaders, @ \$1.75.....	7.00	
	\$15.50	77.6
Blacksmithing: 8 machine picks, @ 4 cents.....	\$0.32	
8 drill-augers, @ 1½ cents.....	0.12	
	0.44	2.2
Supplies: Powder, 10 lb @ 10 cents.....	\$1.00	
Oil and packing.....	0.00	
	\$1.10	5.5
Repairs: On machine, daily pro rata \$60.00.....	\$0.20	
300 days.....		
Hose and piping, pro rata \$60.00.....		
300 days.....	\$0.40	2.0

Compressor: One engineer	\$2.25		
One-half fireman.....	0.88		
Six tons slack coal, @ 15 cents.....	0.90		
Repairs and supplies to compressor.....	1.00		
Repairs and supplies to boilers.....	0.50		
Total for the eight machines.....	5.50		
Expense for one machine	\$5.50	\$0.69	3.5
Interest on \$20,000, @ 10 per cent. per machine for 1-300 year.....		0.84	4.2
Sinking Fund:			
\$14,000, @ ten years per machine, for 1-300 year.....	0.58		
\$6,000, @ six years per machine for 1-300 year.....	0.42	1.00	5.0
Total.....	\$19.97	100.00	

* 8 for use, 2 as "extras" during repairs.
† Including squibs and paper.

On a tonnage of 50 tons per day per machine, this total expense of \$19.97 gives a rate of 39.9½ cents, or, say, 40 cents per ton for undercutting, blasting and the labor of timbering and loading the coal on the mine cars, as against 50 cents a ton when this same work is done by hand miners. Where the seam is thin, or the coal poor in quality, less coal will be obtained from each machine, and as the expenses will remain about the same, it will make the rate higher; thus, on rooms that produce only 45 tons per day per machine, the rate per ton will be 44½ cents. The estimate is based on a year of 300 working days, which is the minimum that a mine should be worked to produce economically; but as the average working-year for the coal mines of Illinois in 1886 was 206 days, the cost of machine mining, when revised on a basis of 200 days of work for the whole year (to allow for shutting down during the dull season) is at the rate of 43.9½ cents on the 50-ton basis, and 48½ cents on the 45-ton basis, as the total daily expense is raised to \$21.82. The sinking fund charge is 5 per cent., and the interest is 4.2 per cent. of the total daily expenses on the 300-day basis; but the former is increased to 7 per cent. and the latter to 5.7 per cent. when the plant only works 200 days in the year.

A popular figure for the cost of a Harrison machine per day for power, repairs, interest and depreciation is put at \$2.50, or 5 cents to 5.7 cents a ton. This is too low, as will be seen from the estimate (\$2.98), though large plants working full time and having the cutting done by contract could probably work very close to the 5-cent rate.

Triple-Expansion Pumping Engines.

On the opposite page we present an engraving of an entirely new type of pumping engine, built last year by Messrs. E. P. Allis & Co., of Milwaukee, Wis., for the Milwaukee Water Works, a high duty pumping plant. The engine is of the triple-expansion class, being the first one for this kind of work built in America, and at the present time it is the only one of its kind in operation. The duty guaranteed for this engine was 115,000,000 foot-pounds per 100 pounds of coal burned, and the steam pressure to be carried was to be limited to 80 pounds. This guarantee we understand was easily exceeded in the official test, though made under very unfavorable conditions. A duty of 125,000,000 foot-pounds per 100 pounds of coal has been attained under ordinary conditions, burning Anthracite coal of only fair quality, no deductions of any kind being made. This duty is equal to 1.3½ pounds of coal, or about 13.5½ pounds of water per indicated horse-power per hour. The arrangement of the engine is what is termed in marine practice "fore and aft" compound, with three cranks, set 120° apart.

The steam is supplied by ordinary cylindrical tubular boilers without any special setting. Each cylinder has two piston rods, which connect to a forged steel

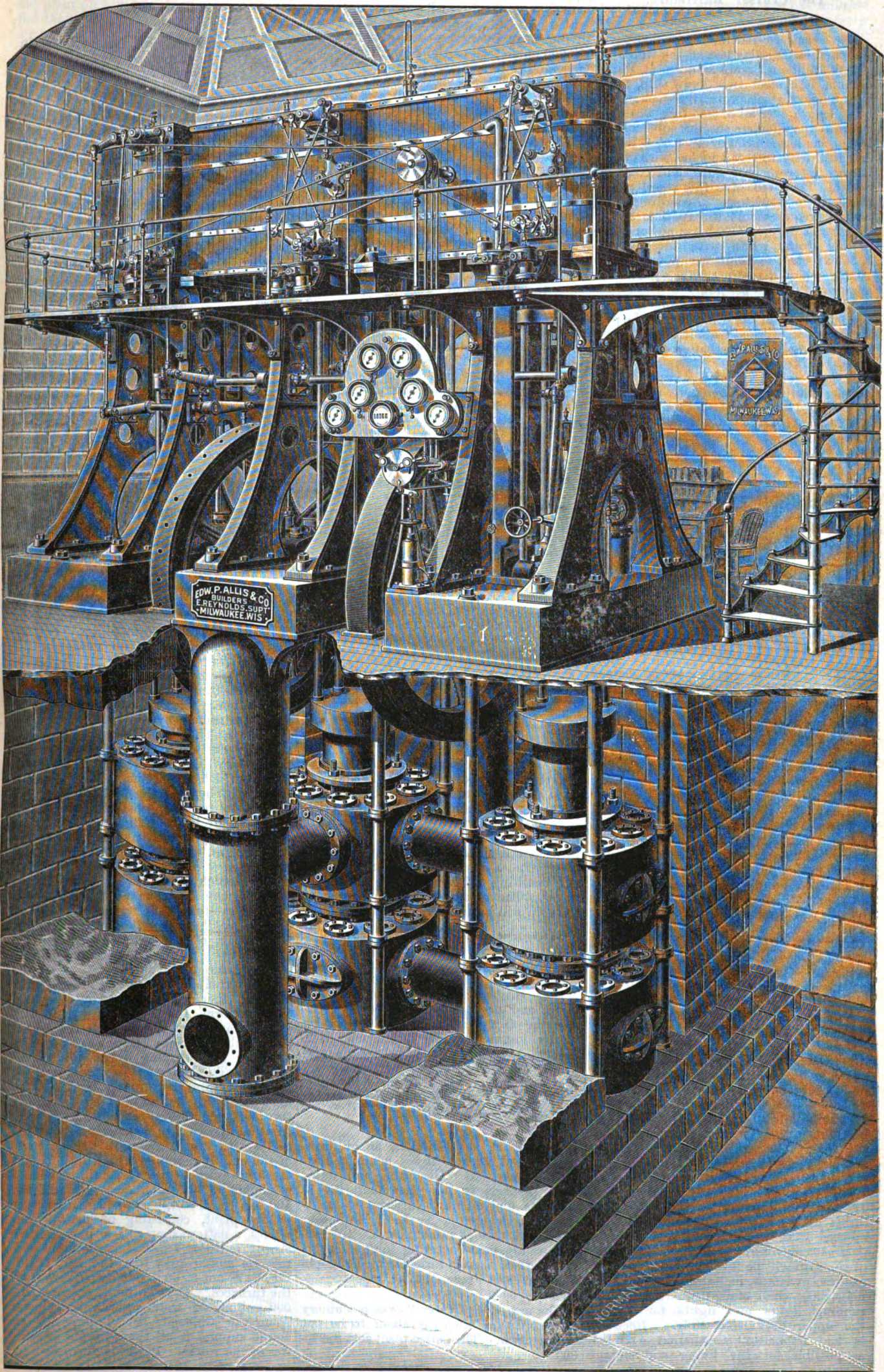
cross-head, connected directly to the pump plungers below by means of four distance rods, which straddle the crankshaft, so that the motion is transmitted directly from the steam pistons to the pump plungers without passing through journals of any description. The three steam cylinders are 20 inches, 35 inches and 40 inches respectively in diameter by 3 feet stroke, and are fitted with the Reynolds-Corliss valve gear, with independent, adjustable cut-off gear for each. They are jacketed and connected by large receivers, which also serve to tie the machines together rigidly. The bed plates of the high and low pressure engines stand on stone piers, while the center or intermediate one rests upon the tops of the suction and discharge air chambers. The entire machine is so accurately balanced and so self-contained that even when running far above the contract speed there is said to be no perceptible vibration.

The pumps shown in the engraving, beneath the floor of the engine room, are of the single-acting, outside-packed-plunger type, with double-beat Cornish valves, arranged in annular chambers, outside of the plunger barrels. The delivery of the pumps is so steady that they have been run a week at a time without any air in either of the air chambers and without the slightest shock upon the pipes or pumps. The nominal pumping capacity of the engine is 6,000,000 gallons in 24 hours against a head of 60 pounds, but it has been operated with a capacity of nearly 9,000,000 gallons without difficulty. It has done the entire work of the Milwaukee high service station for nearly a year and has never been stopped necessarily during that time, excepting for a few minutes at night in order to pack piston rods or valve stems.

Messrs. Allis & Co. are at present building five engines similar to the one illustrated for the new Chicago Water Works plant, which will have a nominal capacity of 15,000,000 gallons each against a head of 125 feet, but are guaranteed to deliver 18,000,000 gallons each per day without overloading. They are also building four triple-expansion pumping engines of a somewhat different style for the City Water Works of Albany, N. Y., which will have a daily capacity of 5,000,000 each, against a head of 310 feet.

Among the monster pumping engines in course of construction at the Allis Works especially worthy of notice is the plant for the City of Milwaukee, to be used for flushing the river which passes through the center of the city. The outfit is to deliver 350,000,000 gallons of water per 24 hours from Lake Michigan into the river, above the city.

The channel span of the new Chesapeake and Ohio railroad bridge in course of erection between Cincinnati and Covington, collapsed on Sunday morning with a tremendous crash. The disaster was caused by the accumulations of drift during the recent high water against the trestle or false-work of the bridge. The span which collapsed was 100 feet high, and on top of it was a "traveler." The structure was weighted with some freight cars loaded with pig iron and other heavy material, besides 700,000 pounds of bridge iron, to make it steady. The loss is estimated at \$90,000, and will fall on the Keystone Bridge Company, of Pittsburgh. A Cincinnati dispatch says: "Superintendent Milliken had exhausted all known resources to avoid the catastrophe. A large pile protector had been anchored above the span, with two lines of booms formed of coal barges, dividing the heavy masses of driftwood and sliding the bulk of it under the completed span on the south shore of the river or between the north-most pier and the Ohio shore, where the superstructure has not yet been begun."



TRIPLE-EXPANSION PUMPING ENGINES AT THE MILWAUKEE WATER WORKS, BUILT BY MESSRS. E. P. ALLIS & CO.

The Cruiser Baltimore.

The cruiser Baltimore, which was launched on Tuesday last at the works of Messrs. William Cramp & Sons, at Philadelphia, is a steel twin-screw ship, fitted with a heavy steel protective deck. She has a length over all of 335 feet, while between perpendiculars she measures 20 feet less. She has a beam of 48 feet 6 inches and will draw 19 feet 6 inches with all her battery, stores, provisions and coal on board. This will give the vessel a displacement of 4400 tons. According to the contract requirements the Baltimore's engines must develop 7500 horse-power under natural draft, while with forced draft it is expected to bring the power up to 10,750, which gives the cruiser a maximum speed of 19 knots per hour.

The rudder and steam steering gear are placed below the water line, under the protective deck, worked from the chart-house and conning tower, so that in case a shot should strike the cruiser above the water line the steering gear of the vessel would escape uninjured. There are to be two masts fitted with military tops, but they

spaces by means of pipes, louveres and cowls. Artificial ventilation is also provided for all compartments below the living deck by means of two blowers of 10,000 cubic feet capacity per minute, so arranged as to exhaust from or force air to the several parts of the vessel, and to deliver it into the lower parts of the engine-room or the open air. A steam bilge pump has already been placed in each engine-room, with suction from the sea, the engine-room bilge, the ship's drainage system and the boilers each delivering into the fire main or overboard. The steam windlass, which is fitted on the forward gun deck, is worked by an independent engine. The main battery will consist of four 8-inch breech-loading rifles, mounted on the poop and fore-castle decks, 26½ and 28 feet respectively above the water. Besides these there will be six 6-inch breech-loading rifles, mounted 18 feet above the water in sponsons, having a train of 155° from the line of the keel for the forward and after pairs and a train of 130° for the guns in the waist. The secondary battery consists of six 6-pounders, rapid-fire guns, six Hotchkiss revolving cannon and four Gatlings. Five above-water launching

Endurance of "Baltimore"

Speed.	I. H. P.	Coal.		Distance per day.	On normal supply of 400 tons.		On full bunker capacity, 850 tons.		Coal per I. H. P. per hour.
		Per hour.	Per day.		Distance can steam.	Days.	Distance can steam.	Days.	
Knots.		Tons.	Tons.	Knots.	Knots.		Knots.		Pounds.
19	10,000	9.82	235.68	456	771	1.69	1,637	3.59	2.20
18	8,100	5.79	138.96	432	1,244	2.88	2,644	6.12	1.60
17	6,600	4.71	113.04	408	1,444	3.54	3,068	7.52	1.60
16	5,250	3.30	77.20	384	1,939	5.05	4,120	10.73	1.60
15	4,250	3.00	72.00	360	2,002	5.56	4,255	11.81	1.60
14	3,450	2.46	59.04	336	2,275	6.77	4,834	14.39	1.60
13	2,800	2.00	48.00	312	2,549	8.33	5,522	17.70	1.60
12	2,250	1.61	38.57	288	2,886	10.02	6,132	21.29	1.60
11	1,750	1.25	30.00	264	3,480	13.33	7,395	28.32	1.60
10	1,400	1.03	25.02	240	3,838	15.99	8,155	33.98	1.65
9	1,100	.83	19.92	216	4,337	20.08	9,213	42.67	1.70
8	820	.65	15.60	192	4,905	25.60	10,445	54.40	1.80

will not be put in place until after the vessel has been launched and has all of her boilers and machinery in place. A large military top with bullet-proof armor will be erected on each masthead, fitted to hold modern machine guns of rapid fire. Hotchkiss revolving cannon or long-range single-barrel guns will be mounted here.

The coal supply of the new cruiser is 400 tons at her normal draft, while her bunker capacity is estimated at 850 tons. The Baltimore is intended to be a flagship, which will carry the commander-in-chief of the station to which the vessel may be attached. The engines are of the triple-expansion type, two in number, placed in separate water-tight compartments. The cylinders are 42, 60 and 94 inches in diameter, with 42-inch stroke. There are two three-bladed screws, 14 feet 6 inches in diameter. The boilers are ready in the shops now, and consist of four double-ended horizontal return tubular boilers, 14 feet 8 inches in diameter, each having at each end four corrugated furnaces 3 feet in diameter. Two electric plants of the most approved pattern, the lightest and most compact and best adapted for marine work, are ready to be placed aboard the vessel. The dynamos are each of 3200 candle-power, so constituted that lights 10, 16, 32 and 50 candle-power can be used on the same circuit, with an independent control over each lamp. All parts of the ship will be fully lighted by the incandescent lamps, including coal bunkers, magazines, shell and ammunition rooms, running lights and lights for use on the upper decks and aloft. Recourse is had to natural ventilation as much as possible for the living and storage

tubes or guns are fitted—two fixed tubes forward, firing directly ahead, and one fixed aft, and a training tube on each bow. An armored conning tower 3 inches thick is being fitted on the fore-castle with a horizontal cover 1 inch thick, with openings in the sides for outlooks. Engine telegraphs, a steering-wheel, an indicator and speaking tubes are to be within the tower. The appended endurance table of the ship will prove of further interest.

We are in receipt of the report of the proceedings of the twenty-first annual convention of the American Railway Master Mechanics' Association, held last June, and need perhaps scarcely emphasize the fact that it is in all respects a highly instructive and interesting little volume. Those who have even superficially followed the work of the association are well aware of its valuable character and will find this latest report to meet all their expectations.

William P. C. Whitaker, an old iron-maker, died recently at his home in Harford County, Md. His father and uncle were pioneers in iron manufacturing in America, and operated furnaces at Reading, Pa., Bridgeton, N. J., Wilmington, Del., and various other places. He carried on the manufacturing long after his father died, having furnaces at Principio and Havre de Grace, Md.

The new Holly Water Works machinery at Port Huron, Mich., is about to be put in operation. The entire plant cost \$222,000

The Chicago Crucible Steel Casting Company.

A new plant has just been erected in Chicago for the manufacture of steel castings by the Chicago Crucible Steel Casting Company. Their old works, located at 1326 to 1330 Indiana avenue, proved to be too small for the demands made upon them, and they have been abandoned and the equipment has been removed to the new location. The site of the new works is near the Elston avenue crossing of the Chicago and Northwestern Railroad, a branch of which road runs alongside the main building. The location was selected mainly on account of the excellent facilities which this railroad company give their patrons. It is conveniently reached by the trains on the Milwaukee division, all of which going north are obliged to stop opposite the works before crossing a draw-bridge over the Chicago River. In addition to their railroad facilities the company have good dockage on the river, which is navigable to Lake Michigan. The ground owned by them comprises four acres. The main building is a substantial structure, built of hand-made brick with a slate roof, one story high, and 220 feet long by 80 feet wide. It contains four double crucible steel furnaces of 12 pots each, one 8-ton open-hearth steel furnace, and one 3-ton iron cupola, together with gas producers, recuperators, &c. The cupola is intended for the manufacture of flasks, &c., for the company's own use, but may also be put into service for the production of special iron castings of a high grade. It has a capacity of 20 tons in 12 hours. Space has been provided for two additional open-hearth furnaces or for crucible furnaces, to be erected as the necessities of the business may require them. Six heats can be made in the crucible furnaces and four in the open-hearth furnaces every 24 hours. The present melting capacity is about 43 tons in that time. The furnaces were designed and constructed by John Zellweger, of Chicago. The principle on which his gas furnaces are constructed is, as explained by him, "the recuperation of heat," which is accomplished by the transfer of heat to the air entering the furnace to promote combustion of the gas, this air being sufficiently heated to melt cast iron before it comes in contact with the gas. The molding floor contains 8500 square feet and is served by four cranes, which reach every part of it. There is one 16-ton crane, two are 6-ton and one is 3-ton. The furnaces, gas producers, coal heat form, &c., are arranged in the part of the building nearest the railroad track for the convenient handling of raw materials.

Small crucible castings are poured on a molding floor, consisting of an elevated iron platform, 146 feet long by 20 feet wide, arranged on a level with the top of the crucible furnaces. Under the platform are four large drying ovens to dry the molds. These ovens are operated by waste heat from the furnaces, and are thus kept uniformly hot without any expenditure for fuel. A railroad track runs in front of the ovens, connecting by turntables with branch tracks in various parts of the building, and on which iron trucks are run to move heavy castings with a minimum of labor. A second building, 100 feet by 50 feet, contains the remainder of the plant, consisting of drilling machines, a pattern shop and a blacksmith's shop. Patterns received from other parties are stored away from the main building, so as not to be in danger of fire from the furnaces. A large tank, holding 80,000 gallons of water, which is pumped from the Chicago River, provides an ample supply at all times for the necessities of the works. Power is furnished by

two 50 horse-power engines. The castings manufactured by this company at their old plant on Indiana avenue have achieved for them an excellent reputation. They are made under a process perfected by Dr. J. W. Chisholm and Wm. Chambers early in the present year, after many months of careful experiments. These castings are soft enough to work under any tool, have been tested up to 70,000 and 80,000 pounds tensile strain, are practically free from blow-holes. They can be delivered in two or three days after the patterns are received, annealing being done away with. The promptness with which the company can deliver work is a strong recommendation to consumers, while the high character of their castings seems to be established by the testimonials which they submit from those who have given them orders. Orders are now in hand for steel castings from many parts of the United States. The officers of the company are as follows: Dr. J. W. Chisholm, president; William Chambers, secretary; R. W. Rathbone, Jr., treasurer. They maintain a city office in the Rookery Building, on the corner of La Salle and Adams street.

Wages in Iron Works.

The eager discussion now going on over every point involved in the questions affecting the tariff is bringing to us many inquiries concerning the wages paid in iron and steel works. Staggering statements are being made by those who would have the public believe that labor in our iron mills is poorly paid. No more striking illustration of this point, and of the great stupidity with which statistics have been perverted, has come to our notice than that of an article printed in the New York *World* of August 22d over the signature of T. E. Willson. This unknown manipulator of statistics has overhauled a number of industries, among them the manufacture of iron and steel, his guide being the census reports. He takes up in detail the blast furnaces, the bloomeries and forges, the rolling mills, Bessemer works, file makers and manufacturers of cutlery and edge tools. We need only dispose of the general table relating to iron and steel to show the methods employed. We quote:

The following table of wages paid in States will be found on page 1138 of the census:

State.	No. shops.	Average No. workers.	Total wages.	Average yearly wages.	Average weekly wages.
Alabama.....	14	1,626	\$571,713	\$351	\$6.75
California.....	1	319	177,722	556	10.69
Colorado.....	1	125	7,000	56	1.07
Connecticut.....	19	685	331,184	484	9.31
Delaware.....	9	867	344,476	397	7.63
District Columbia.....	1	18	7,527	418	8.14
Georgia.....	14	1,303	185,489	142	2.73
Illinois.....	21	5,253	2,508,718	477	9.17
Indiana.....	12	2,048	864,921	422	8.11
Kansas.....	2	630	166,500	264	5.08
Kentucky.....	29	4,095	1,344,500	326	6.27
Maine.....	3	700	141,494	202	3.88
Maryland.....	23	2,763	905,090	327	6.29
Massachusetts.....	30	6,513	2,576,539	395	7.59
Michigan.....	22	3,089	922,597	298	5.73
Missouri.....	22	3,139	734,575	234	4.50
Nebraska.....	1	100	50,000	500	9.61
New Hampshire.....	2	290	127,690	440	8.46
New Jersey.....	40	4,792	1,808,448	377	7.25
New York.....	89	11,444	4,099,451	358	6.88
North Carolina.....	20	63	7,907	126	2.42
Ohio.....	134	20,071	8,265,070	412	7.92
Oregon.....	1	250	46,822	187	3.59
Pennsylvania.....	366	57,952	25,065,850	433	8.32
Rhode Island.....	3	275	130,969	476	9.15
Tennessee.....	43	3,077	659,773	214	4.11
Texas.....	1	140	27,720	198	3.81
Vermont.....	4	191	50,035	262	5.04
Virginia.....	44	2,522	665,432	264	5.08
West Virginia.....	20	4,121	1,541,816	374	7.19
Wisconsin.....	9	2,153	1,004,931	467	8.96
Wyoming.....	1	184	79,650	433	8.32

Protection cannot prevent the wages paid in California, Connecticut, Illinois or Indiana from falling to the level paid in New York, nor the wages paid in New York and Pennsylvania from falling to the wages paid in Tennessee or Missouri. Are the latter high wages?

How can the bulwark of protection protect the Northern workman from the pauper wages of Georgia, North Carolina and Tennessee? It has not protected the workmen in Southern States from a reduction to foreign pauper wages. The Northern mechanic must look to something besides protection to keep his wages at their present level.

The first three columns are a correct reproduction of the census statistics; the last two have been computed by the eminent statistician who is their author by the simple expedient of dividing the total wages by the number of workers to get the yearly wages, and dividing the latter by 52 to reach the average weekly wages. The result ought to have struck even the editor of the *World* as amazing. In Colorado, where wages are high, the wretched ironworkers are content with \$56 a year, or \$1.07 a week. In Georgia their weekly compensation figures out \$2.73, and in North Carolina \$2.42. A moment's reflection would have taught Statistician Willson that the works making returns may have been in operation for only a fraction of the year. The same stupendous blunder runs throughout the whole article, and is all the more inexcusable because Mr. James M. Swank, the highest statistical authority in this country, has in his special census report furnished in detail the very data which Mr. Willson tried to get at in the ridiculous manner alluded to. We quote from page 47 of his report as special agent of the census:

Wages and Hours of Labor.

State.	Average No. of hours per w.k.	Average day's wages, skilled mechanic.	Average day's wages, ordinary labor.
Alabama.....	74	\$2.27	\$1.14
California.....	80	3.00	1.75
Colorado.....	80	4.00	1.75
Connecticut.....	84	2.74	1.27
Delaware.....	56	2.49	1.17
Georgia.....	63	2.19	.85
Illinois.....	63	3.43	1.27
Indiana.....	67	3.21	1.23
Kansas.....	56	3.00	1.25
Kentucky.....	69	2.73	1.13
Maine.....	65	2.47	1.15
Maryland.....	72	1.90	.96
Massachusetts.....	60	2.71	1.27
Michigan.....	70	1.92	1.25
Minnesota.....	60	2.00	1.50
Missouri.....	69	2.74	1.27
Nebraska.....	60	3.00	1.50
New Hampshire.....	57	2.00	1.19
New Jersey.....	63	2.32	1.21
New York.....	68	2.43	1.18
North Carolina.....	73	1.25	.54
Ohio.....	66	2.89	1.30
Oregon.....	72	3.00	1.50
Pennsylvania.....	66	2.32	1.13
Rhode Island.....	60	4.00	1.17
Tennessee.....	67	1.62	.88
Texas.....	60	2.00	1.00
Vermont.....	75	3.30	1.28
Virginia.....	61	1.73	.89
West Virginia.....	66	2.28	1.10
Wisconsin.....	74	2.07	1.19
District of Columbia.....	54	2.50	1.62
Wyoming.....	60	4.00	2.00
Average.....	65	2.59	1.24

If further confirmation were needed we need only point to the figures collected by A. S. Bolles, chief of the Bureau of Statistics of Pennsylvania, and published in the annual report for the year 1887. These figures, besides, have the merit of being more recent, though, of course, they cover individual cases only.

Wages in a Pennsylvania Iron Works, 1887.

Hours.	Rate per hour.	Total earnings.	Per cent. wages paid each class.
462,230.....	0.090	\$41,634.61	2.6
6,938,790.....	0.140	989,797.09	60.2
1,498,300.....	0.238	349,959.09	21.7
553,040.....	0.451	249,508.78	15.5
9,423,420.....	0.171	\$1,610,899.57	.....

Mr. Bolles has, at the suggestion of the works, grouped the workmen according to their wages per hour into four divisions, the first including all who receive from 5 to 12 cents an hour inclusive, the second receive 12 to 20 cents, the third 20 to 33 cents, and the fourth class includes all

who are paid 33 to 65 cents an hour. The day is one of 10 hours throughout. Tabulated thus the employees stand as follows:

First classification.		Second classification.	
Per cent.	Received per day.	Per cent.	Received per day.
3.3	\$0.50	40.7	\$1.20
0.4	.61 $\frac{1}{2}$	0.8	1.25
3.8	.70	13.9	1.30
15.2	.75	5.6	1.35
12.1	.80	4.5	1.40
2.2	.85	2.6	1.45
12.1	.90	7.7	1.50
34.1	1.00	3.9	1.55
6.7	1.05	2.3	1.60
4.3	1.10	1.5	1.65
5.6	1.16	1.6	1.70
.....	.....	3.3	1.75
.....	.....	3.0	1.80
.....	.....	4.5	1.85
.....	.....	1.6	1.90
.....	.....	2.0	1.95
.....	.....	0.6	1.97

Third classification.		Fourth classification.	
Per cent.	Received per day.	Per cent.	Received per day.
17.1	\$2.00	16.5	\$3.10
10.8	2.08	7.2	3.25
7.7	2.10	5.6	3.33
6.0	2.15	5.1	3.42
4.9	2.20	1.4	3.50
5.7	2.25	0.9	3.58
1.8	2.30	1.2	3.60
5.6	2.35	9.4	3.62
1.6	2.40	2.1	4.01
4.1	2.45	1.4	4.23
7.7	2.50	21.3	4.29
1.2	2.55	0.9	4.60
2.2	2.65	1.5	4.70
2.3	2.70	2.3	4.90
1.1	2.75	3.4	5.08
1.3	2.79	5.2	5.35
3.8	2.87	0.8	5.50
1.7	2.93	3.3	5.80
3.4	3.00	0.7	5.95
1.8	3.08	4.2	6.21
1.5	3.10	2.3	6.42
2.0	3.20	2.5	6.47
4.7	3.23	.....	.....

WAGES IN A LARGE PENNSYLVANIA MILL.

Another large works have prepared the following statistics, which we have tabulated:

	Number employed.	Average number of days employed.	Wages per day.	Average earnings per year.	Average earnings three best men.
Puddlers.....	328	261	\$3.50	\$913.55	\$980.06
Muck rollers....	4	261	8.83	2,308.73	.....
Muck weighers, shearmen and day hands about forge.....	118	232	1.73	506.77	.....
Scrapers.....	2	249	4.11	1,024.16	.....
Bottom furnace heaters.....	4	239	5.08	1,214.39	.....
Blacksmiths.....	28	264	2.75	726.00	844.80
Blacksmiths' helpers.....	26	264	1.65	435.00	.....
Millwrights.....	15	310	2.75	824.51*	1,069.11
Bolt, rivet and spike makers.....	15	309	3.70	1,144.36	1,445.29
Bolt department, miscellaneous hands.....	32	309	2.22	687.25	851.05
Boys in bolt department.....	30	309	.82	265.97	327.35
Chainmakers.....	38	308	2.50	770.00	986.63
Miscellaneous workmen, chain factory.....	19	308	1.96	603.68	657.06
Furnace boys, chain factory.....	34	308	.60	184.80	200.08
Machinists.....	127	306	2.70	828.12	1,061.80
Apprentices, machine shop.....	7	306	.83	324.94	.....
Machine shop laborers.....	17	306	1.57	481.95	.....
Molders in foundry.....	60	307	2.78	853.66	1,185.15
Apprentices in foundry.....	15	307	.97	289.39	.....
Laborers in foundry.....	29	307	1.50	542.16	.....
Bricklayers.....	10	309	3.80	1,174.20	1,526.56
Bricklayers' helpers.....	11	309	1.76	543.84	684.61
Pattern-makers.....	11	302	2.52	763.78	953.97
Pattern-makers' apprentices.....	4	302	.89	268.08	306.00
Carpenters.....	15	301	2.52	753.65	943.38
Engineers.....	24	307	3.16	969.79	1,116.09
Spool-engine boys.....	13	307	1.33	409.41	.....
Miscellaneous workmen.....	283	282	1.40	394.80	483.75
Pull up boys.....	36	211	.65	137.15	.....
Laborers in rolling mill.....	302	.....	1.35	442.38*	526.50
Extra laborers in rolling mill.....	47	303	1.69	513.58	606.74

Stockers.....	37	309	1.55	711.86*	.....
Teamsters.....	6	308	1.88	579.04	611.89
Watchman and furnace firemen.....	13	305	1.96	598.54	730.00
Railroad-track layers.....	14	301	1.69	510.13	.....
Heaters, 16-inch bar mill, new mill.....	6	147	7.33	1,077.51	.....
Finishers and roughers, bar mill.....	5	147	3.02	433.93	.....
Rollers, bar mill.....	1	147	18.02	2,648.94	.....
Assistant roller, bar mill.....	1	147	7.85	1,153.95	.....
Heaters and helpers, bar mill.....	6	147	2.77	407.19	.....
Catchers, bar mill.....	2	147	6.52	958.44	.....
Catchers' roughers, bar mill.....	4	147	3.61	530.67	.....
Pilers, chargers, hoop-up's, straighteners, shearman and helpers.....	10	147	3.78	555.66	.....
Bridgeworks, skilled laborers.....	74	308	2.17	667.78	978.06
Laborers, bridge works.....	39	308	1.45	482.22*	.....
Boys, bridge-works.....	7	308	.85	262.82	.....
Rollers, 18-inch mill (pays help).....	1	261	2.18	5,705.30	.....
Roughers, 18-inch mill (no help).....	8	261	4.67	1,219.38	.....
Catchers, 18-inch mill (no help).....	2	261	9.47	2,471.07	.....
Catchers' helpers, 18-inch mill (no help).....	4	261	4.37	1,140.98	.....
Heaters, 18-inch mill (no help).....	6	261	9.95	2,598.04	.....
Heaters' helpers, 18-inch mill (no help).....	6	261	3.84	1,002.10	.....
Piler, charger, drag down, hook-up's, straighteners, shearman.....	32	261	3.63	947.43	.....
Rollers, small mills, 8 and 9 inch trains (no help).....	5	230	11.66	2,681.80	3,055.33 (1 man.)
Assistant rollers, small mills, 8 and 9 inch trains.....	5	230	5.31	1,221.30	1,308.12 (1 man.)
Heaters, small mills, 8 and 9 inch trains.....	10	230	6.63	1,524.90	1,638.00 (1 man.)
Roughers, small mills, 8 and 9 inch trains.....	20	220	3.31	762.45	819.00 (1 man.)
Drag downs, small mills, 8 and 9 inch trains.....	10	220	2.00	460.00	477.00 (1 man.)
Boys, straighteners, scrapers, poke-in.....	40	230	1.20	276.00	285.60
Rollers, small mill, 10 inch (new, single turn).....	1	270	12.50	3,375.00	.....
Assistant roller, small mill, 10-inch, (new single turn).....	1	270	9.54	2,575.80	.....
Heaters, small mill, 10-inch (new, single turn).....	2	270	5.96	1,609.20	.....
Roughers, small mill, 10-inch (new, single turn).....	3	270	2.68	804.60	.....
Boy scrapers, poke-in and straighteners, small mill, 10-inch (new, single turn).....	4	270	1.20	324.00	.....
Drag-downs, small mill, 10-inch (new, single turn).....	2	270	2.70	639.00	.....
Roller, 12-inch bar train (new mill).....	1	179	14.95	2,676.05	.....
Assistant roller, 12-inch bar train (new mill).....	1	179	5.91	1,039.99	.....
Heaters, 12-inch bar train (new mill).....	6	179	5.42	970.18	.....
Catchers, 12-inch bar train (new mill).....	2	179	4.74	848.46	.....
Roughers, 12-inch bar train (new mill).....	8	179	3.19	571.01	.....
Pilers, chargers, drag-downs, loop-ups, straighteners, helpers and shearers, 12-inch bar train (new mill).....	16	179	2.84	508.06	.....

Roller, 12-inch bar mill.....	1	252	11.41	2,875.32	.....
Assistant roller (paid by roller), 12-inch bar mill.....	1	252	4.76	1,199.52	.....
Heaters (paid by roller).....	6	252	4.44	1,118.88	.....
Catchers (paid by roller).....	2	252	4.78	1,204.56	.....
Roughers (paid by roller).....	8	252	2.62	600.24	.....
Piler, charger, drag-out, hook-up, straightener, shearman and helper.....	16	252	2.33	587.16	.....
Roller, net earnings, 16-inch bar mill (re-modeled, part idle).....	1	232	9.29	2,255.28	.....
Assistant roller, net earnings, 16-inch bar mill.....	1	232	5.01	1,182.32	.....
Roughers and finishers, net earnings, 16-inch bar mill.....	5	232	2.76	640.32	.....
Catchers, net earnings, 16-inch bar mill.....	2	232	4.16	966.12	.....
Catchers' roughers, net earnings, 16-inch bar mill.....	4	232	2.31	535.93	.....
Heaters, net earnings, 16-inch bar mill.....	6	232	4.68	1,085.76	.....
Heater, helper, piler, drag-down, hook-up, straightener, shearman and helper.....	8	232	2.43	563.76	.....
Roller at sheet mill, net.....	2	183	6.69	1,224.27	.....
Heaters, sheet mill.....	2	183	5.08	929.04	.....
Rollers, plate mill, net.....	2	204	7.35	1,499.40	.....
Heaters, plate mill.....	2	204	5.61	1,144.44	.....
Catchers and roughers, plate mill.....	4	204	2.50	510.00	.....
Nailers.....	21	276	3.78	1,403.80	1,217.77
Nail feeders, boys.....	71	276	1.12	308.73	416.85
Rollers, nail mill.....	2	193	6.83	1,319.16	.....
Catchers, nail mill.....	2	193	3.41	609.58	.....
Heaters, nail mill.....	4	193	4.82	930.13	.....
Roughers, nail mill.....	2	193	2.00	386.00	.....

In considering the earnings of the men for the year it should be taken into account that the 16-inch bar mill was in operation only 147 days, being a new mill, that the 10-inch train is also now worked only single turn, and that only for a part of the year, the full year being 306 turns, and also that the 16-inch bar mill was re-modeled, and was therefore running only during a part of the year.

WAGES IN BESSEMER STEEL MILLS.

Below we reproduce a table given in the report of Mr. A. S. Bolles, the mill A having run 245 turns during the year. All the men work on a tonnage basis, except those marked with an asterisk:

Mill A—245 turns.				
Occupation or Kind of Workmen.	Number.	Average wages per day.	Earnings for each man for year.	
Metal wheelers.....	12	\$2.47	\$606.99	
Coke wheelers.....	4	2.24	549.45	
Holst boys.....	1	1.76	431.51	
Cupola foreman.....	2	4.47	1,066.04	
Cupola foremen helpers.....	2	2.96	719.18	
Cinder men.....	4	2.19	537.95	
Ferromen.....	2	2.34	575.35	
Vessel foreman.....	1	4.38	1,075.90	
Vessel foreman helpers.....	2	2.93	719.18	
Scrapers.....	4	2.03	497.68	
Vessel cinder men.....	4	2.06	503.02	
Steel pourers.....	2	4.38	1,075.90	
Pitmen.....	14	3.54	867.27	
Sanders.....	2	3.54	867.27	
Stopper setters.....	2	3.33	817.00	
First regulators.....	2	2.66	653.02	
Second regulators.....	6	2.03	497.68	
Ladle liners.....	2	3.28	805.49	
Ladle liners' helpers.....	2	2.72	667.40	
Pushermen.....	4	2.34	575.35	
Bottom-maker.....	1	3.40	834.25	
Bottom-maker helper.....	1	2.77	678.91	
Stopper-maker.....	1	2.93	719.18	
Pipe-fitter.....	1	2.93	719.18	
Pipe-fitter helper.....	1	1.76	431.51	
Rollers.....	2	5.50	1,347.57	

Roughers.....	2	4.12	1,010.88
Hookers.....	10	3.12	765.67
Shearman.....	2	4.12	1,010.88
Shearman helpers.....	8	2.77	679.36
Shearman buggyman.....	2	2.04	501.16
Heaters.....	4	5.50	1,347.57
Bottom-makers.....	2	3.40	835.27
Bottom-makers' helpers.....	2	2.27	556.85
Chargers.....	6	3.07	751.74
Covermen.....	2	1.70	417.68
Regulators.....	2	2.07	506.73
Rack boys.....	2	1.70	417.68
Heater helpers.....	6	3.40	835.27
Chargers.....	6	2.77	679.36
Blowing engineers.....	2	3.75	925.00
Reversing engineers.....	2	3.25	795.00
Fan engineers.....	2	2.30	560.00
Small locomotive engineers.....	*10	2.30	560.00
Laborers.....	*106	1.62	406.00
Millwrights.....	*3	3.90	1,170.00
Boys from 62½ cents to \$1 per day.....	*20		
Total.....	282		

Mill B is another large Pennsylvania works, the figures being for the Bessemer and blooming mill departments of the establishment:

Mill B, Converting Department, 304 Turns.

Occupation.	Number.	Average daily wages.	Yearly earnings.
Metal wheelers.....	9	\$1.92	\$588.95
Vessel hands.....	6	4.29	1,318.19
Pitmen.....	21	3.56	1,094.31
Ladle hands.....	9	3.55	1,089.96
Metal wheelers.....	33	3.16	989.75
Metal cupola hands.....	15	3.40	1,045.64
Trough hands.....	9	3.11	955.64
Spiegel cupola hands.....	9	2.92	886.67
Coke fillers.....	6	2.06	634.24
Holstmen.....	3	2.11	644.69
Cupola hands.....	3	1.89	581.29
Cinder men.....	15	3.13	961.96
Pulpit hands.....	6	2.50	766.93
Blowers.....	2	4.42	1,357.37
Stock weighmen.....	2	3.95	1,212.32
Bottom makers, No. 1.....	2	3.41	1,046.28
No. 2.....	2	1.97	606.16
Cupola repairmen.....	8	2.71	822.80
Stopper maker.....	1	3.02	929.50
Cupola cinder men.....	8	1.70	520.78
Metal gang.....	6	1.92	588.41
Engineers.....	2	2.96	906.80
Assistant engineers.....	4	1.49	456.48
Watertenders.....	6	2.70	829.25
Laborers (325 days).....	43	1.20	384.30
Ganister mixers (324 days).....	8		434.04
Second-class laborers.....	14	1.00	324.00

Mill B, Blooming Department, 307 Turns.

Occupation.	Number.	Average daily wages.	Yearly earnings.
Heaters.....	3	\$4.60	\$1,399.27
Heaters' helpers.....	39	3.53	1,073.43
Chippers.....	4	3.87	1,181.41
Screwmen.....	3	3.77	1,146.62
Front tablemen.....	3	3.67	1,121.14
Engineers at rolls.....	3	3.00	910.00
Inspectors.....	3	2.88	869.21
Back tablemen.....	3	2.76	839.70
Seamen, bookers, telegraphers and loaders.....	18	2.62	796.63
Pull-arounds.....	2	2.52	766.30
Markers.....	6	2.48	752.76
Watertenders.....	4	2.70	829.24
Furnace bottomers.....	4	1.80	548.40
Day laborers.....	18	1.20	382.56

This enumeration does not include foremen. The wages paid in the rail mill of the same works are given in the following table, which we have compiled from the same source.

WAGES IN A STEEL RAIL MILL, ON TONNAGE BASIS.

	No. employed.	Number days employed.	Average daily wages.	Yearly earnings.
Stockers.....	10	237	\$1.71	\$405.42
Heaters.....	20	237	4.22	988.48
Extra helpers.....	20	237	2.40	568.44
Sawyer.....	1	237		1,082.55
Sawyer's assistant.....	1	237	2.25	543.25
Bugymen.....	8	237	2.38	562.88
Roughers.....	4	237	3.44	815.70
Hookers and catchers.....	12	237	3.24	777.53
Cold straighteners.....	8	237	3.95	927.36
Gaggers.....	8	237	2.29	543.28
Hot straighteners.....	10	237	2.15	510.30
Levermen.....	2	237	2.15	511.25
Railmarkers.....	2	237	2.88	682.96
Assistant rail markers.....	2	244	1.20	292.80
Chippers.....	2	237	2.22	532.60
Telegraphers.....	12	240	1.20	288.00
Rail run-outs and pull-ups.....	18	240	1.20	288.44
Rail run-outs.....	20	244	1.14	280.00
Greasers.....	2	279	1.50	418.75

Rail drag-out boys...	6	237	1.05	248.70
Inspectors.....	2	237	1.93	457.30
Assistant inspectors, boys.....	2	217	.80	173.02
Rail catchers for drillers.....	13	238	1.52	361.30
Engineers.....	2	232	1.75	455.50
Engineers.....	2	272	1.70	462.39
First-class laborers..	120	302	1.20	362.35

A glance along the columns of figures presented, covering, as they do, a wide field in iron and steel manufacturing, should be sufficient to prove that while the average wages paid in iron works are high, there are, in every mill, a number of positions which are unusually remunerative. The proportion of skill and labor is very large, indeed. Any one familiar with the wages question in American iron works knows that the examples chosen are not exceptional; that with fairly steady employment the earnings in the mills are large, compared with the sums earned in other industries.

THE WEEK.

There are 200 cases of lead poisoning in Newark, N. J., of which 20 are in St. Michael's Hospital. The prevalence of the disease is attributed to the use of beer drawn through lead pipes and "soft" drinks from bottles rinsed with shot.

A bridge-building firm in Philadelphia have received orders for structural iron amounting to over \$250,000 from the New Jersey Central. This is to replace the iron bridges on the line east of Bound Brook and on the Newark branch. The material is now being delivered.

The business sentiment of Chicago is reflected by the *Tribune*, of that city, which says: "The wealth of the Northwest has been increasing enormously for years past. Even during the period when the price of wheat was so low and many people demonstrated to their own satisfaction that the farmers were losing money, the buying power of the masses somehow grew greater and greater. How much more rapid will be the progress with wheat 10 or 15 per cent. higher, an abundant yield of corn and other agricultural products at least fully up to the average. It is in Chicago that the richest bloom of this prosperity will be seen. This city is the central point of exchange for the best parts of the West. The wheat of Dakota, the corn of Nebraska and the cattle of Wyoming will soon be converted into bank deposits, buildings and railroad tracks in and around Chicago. Every week sees the inception of some new enterprise of general importance in this city, and the early fall will witness an unwonted activity in pushing those schemes."

The large paper mill of Geo. A. Whiting, of Neenah, Wis., caught fire in the boiler room, and while the flames were in progress the iron bleach, filled with steam and rags, exploded when the cold water from the fire engines struck it, and 14 persons were killed by the fragments which were thrown in every direction.

The extensive chemical works at Bushwick, L. I., Buffalo, N. Y., and Bayonne, N. J., owned by Martin Kalbfleisch's Sons, will be sold by the receiver of that firm some time in October. The disagreements of the firm respecting the manner of doing business are the cause of the dissolution. In the days of the ex-mayor the property was worth several millions.

The approaching completion of the Mexican National Railroad line from Corpus Christi, in Texas, to the City of Mexico, a distance of 1205 miles, will signalize the opening of the second great line of transportation between the United States and the neighboring republic. From the main line there will be branches to the great mining region around Zacatecas and

other branches to Monterey, Salvatierra and Tlascala. A line is now also building by the construction company from Manzanillo, the first harbor on the Pacific Coast of old Mexico, thus initiating a through line to Corpus Christi. Guaymas, in Sonora and on the Gulf of California, is a fine harbor further north, but to reach it vessels from San Francisco are compelled to round Cape San Lucas, the southern point of Lower California, and then sail half up the gulf before Guaymas is reached. But Manzanillo is a magnificent harbor, and directly in the course of the San Francisco vessels. Another result promised is the opening of a fine harbor at Asonzas, on the Texas coast, where deep water is much needed.

The process of laying a submarine pipe in St. Louis Bay, parallel with the Northern Pacific Bridge, is described by the *Superior Inter-Ocean*: "The pipe, which is jointed on shore into sections sometimes 100 feet in length, is swung in a cradle made of barrels, and is then towed to the side of the scow, upon which the men and machinery are. The pipe is gotten in line, and the tackle blocks attached. The pipe is allowed to sink gradually by cutting the barrels at such places as will let the pipes descend in a horizontal position." About 1000 feet have been laid, and the work proceeds at the rate of 240 feet a day. Divers follow the pipe to the bottom in submarine armor, taking along tools necessary to complete the coupling, which is a device covered by patents.

The annual statement of the business of the Boston Post Office for the fiscal year ending June 30, 1888, shows that gross receipts were \$1,730,377 against \$1,657,273 last year; balance in favor of the Government, after defraying expenses, is \$1,047,000.

Determined action will be taken by the various labor unions to secure the repeal of the conspiracy laws of the State of New York. With this object a call has been issued for a conference of all the trade representatives at Troy, on September 17. As stated by the Central Labor Union the situation is as follows: "Our highest courts have decided that under the present laws it is a crime to organize for the purpose of shortening the hours of labor, regulating the employment of apprentices and that until those laws are repealed any of us may be sent to a felon's cell for refusing to work with a person who is objectionable to us, and that we cannot take united action in refusing to purchase the goods of an unfair employer—in short, we cannot combine for any purpose except that of maintaining or raising wages. Some of our most active members are now under indictment and liable at any time to be sent to jail for exercising what we have always considered to be our rights as men and American citizens."

All attempts to manufacture sorghum sugar profitably in this country are pronounced a failure. Prof. H. W. Wiley, the chemist of the Department of Agriculture, has just published a bulletin of the Chemical Division of the Department of Agriculture, giving, in a condensed form, all the important recorded analyses of sorghum, an abstract of recorded tonnage per acre of sorghum, yield of sugar per ton and other data concerning the merits of sorghum as a sugar-producing plant, and the conclusion reached is that the only hope for sorghum is in the production of a better raw material.

Emancipation in Brazil, as was to have been expected, seriously disconcerts the operations of coffee planters, who suddenly find themselves embarrassed by the absence of available labor and a lack of ready cash wherewith to liquidate the pay roll. A letter from Santos says the receipts of

coffee have been delayed by the want of hands on the plantations, the freedmen being "independent and lazy." Hands are wanted everywhere to mill the coffee.

Yellow fever in Jacksonville is gradually extending. A sanitary inspection of all trains from the South has been ordered before they are permitted to enter Washington, and arrangements have been made by which a special train will run between Jacksonville and Camp Perry, the refuge station in Florida.

The State Prison superintendent is disposing of the large amounts of raw material left on hand in the shops at Albany when prison labor was stopped, and storing away the machinery. No requisitions have yet been secured for convict goods.

The total imports into China in 1887 were valued at \$127,830,000, as against \$109,345,000 in 1886, an increase of \$18,485,000. The larger part of this increase is of cotton yarn and piece goods, mostly from England. Copper and opium imports also showed important increases. A heavy decrease was shown in the imports of refined petroleum. The total imports of this product were only 12,015,000 gallons in 1887, against 23,038,000 gallons in 1886. The total exports in 1887 were valued at \$107,325,000, an increase of over 11 per cent. on the preceding year. Tea, the only important export showing a decrease, fell off 5 per cent. in the quantity and 12 per cent. in the value exported. The exports of silk showed an important increase.

San Francisco papers notice the beginnings of the fall trade in all directions, and indications are considered very promising. "Our foreign imports to date," says the *Commercial Herald*, "exceed those of 1887 by about 22 per cent., the figures being \$30,549,504 for this year and \$25,051,646 for 1887. This in itself is a most convincing testimony of our increase in population and trade. Of a similar character is the result of the assessment of property throughout the State. The total assessed value of property for 1887 was \$908,119,480; for the present year it is \$1,083,333,328; showing an increase of \$175,213,848, or over 18 per cent."

A letter from Chicago says: "There is reported to be intense rivalry between two syndicates, each of which is anxious to have the credit of owning the highest commercial structure in Chicago. One of them started out to construct a 12-story building at Madison and La Salle streets. Then the Chamber of Commerce people decided to raise their roof to the height of 13 stories, and now the first-named party is said to have decided on 15 stories."

Engineer-in-Chief Melville, of the Navy Department, who went to sea on a six-hours' speed trial trip of the Swatara when she started for Brazil a week ago, reports that the engines worked exceedingly well, developing 1330 horse-power at one time, with 64 revolutions per minute of the screw. This is a greater power than was expected, but it could not be kept up until the firemen have greater experience with their work at forced draft.

The bill for the erection of an appraiser's warehouse in the city of New York, as finally sent to the President for his signature, provides for the purchase of a site at a limit of \$850,000 and the erection of a building at a cost not exceeding \$650,000. The Secretary of the Treasury is given discretion to purchase a site large enough to embrace a custom-house building as well as an appraiser's warehouse or to purchase two sites near each other for the two purposes. In this contingency the Secretary is authorized to pay \$2,000,000 for the site. It was estimated that the site of the present Custom-House could be sold for \$3,000,000.

MANUFACTURING.

Iron and Steel.

No. 6 furnace, of the Crane Iron Company, at Catsauqua, Pa., has been blown out for repairs.

The Bethlehem Iron Company, at Bethlehem, Pa., are testing the direct process of hauling the molten pig from the furnaces to the converters, and avoiding melting in the cupolas.

Among recent building permits issued at Cleveland, Ohio, were the following: Cleveland Rolling Mill Company, wire warehouse, \$8000; Otis Iron and Steel Company, new building, \$10,000.

It is reliably reported that the Jackson Iron Company, of Cleveland, Ohio, have definitely decided to remove their furnaces from Fayette, Mich., to some point where the difficulty in obtaining fuel will not be so great. As the company's ore mines are located at Negaunee, Mich., it is the impression that the furnaces will be removed to that point, although the matter has not been definitely settled as yet.

The Richardson Axle and Wheel Company, of Covington, Ky., have been chartered by B. F. Richardson, H. B. Lupton and others, with a capital of \$200,000.

Robert Walker, receiver of the Himrod Furnace Company, has leased the Himrod Furnace to the Mahoning Valley Iron Company, of Youngstown, who have taken possession of the property. The furnace is in fair shape, and, it is expected, will be put in blast this week. The lease is for only three months, the company using the product in their mills until their own furnace, the Hannah, now being rebuilt, is ready for operation.

In reference to the recent cessation of operations at the plant of the Penn Iron Company, Limited, at Lancaster, Pa., we have received the following advice from the company, under date of the 20th inst.: "Our works shut down its puddling department last week because the workmen refused to come out to work when called. We discharged them all and shut down the puddle mill for needed alterations. We are running the finishing mills as usual, and will start up the puddle mill when ready. The trouble with the men was because of certain discharges of some of their number that had previously been made for their inefficiency."

The report recently published that the cold die rolled steel department of the works of the Hartman Steel Company, Limited, at Beaver Falls, Pa., had been closed down on account of a lack of orders is without foundation. That department is in full operation with a fair amount of orders on hand.

The Ohio Valley Foundry Company, of Bellaire, Ohio, built a large addition to their works last year and are now considering the advisability of adding another building, which will almost double their present capacity and give employment to a large number of additional workmen.

The Lawrence Furnace Company, of Ironton, Ohio, propose to build a 30-ton furnace in the vicinity of their present idle charcoal furnace at Culbertson, Lawrence County.

Emma Furnace, of the Union Rolling Mill Company, at Cleveland, Ohio, which has been out of blast for some time undergoing repairs, was blown in again on Wednesday, the 22d inst.

The well-known firm of Hussey, Howe & Co., Limited, steel manufacturers, at Pittsburgh, have been changed to Howe, Brown & Co., Limited. No change in

the manufacturing departments will be made, and the general business will be conducted by the new firm in all its branches, as heretofore. The officers of the new firm are Jas. W. Brown, chairman; W. R. Howe, vice-chairman; G. A. Howe, secretary; T. H. Childs, treasurer. The interests of C. G. Hussey and the estate of his son, C. G. Hussey, have been sold to the other owners.

The Twenty-ninth Street Iron Works, of Carnegie, Phipps & Co., Limited, at Pittsburgh, which have been shut down for some time owing to the fact that a new foundation had to be put in, will resume within the next week. The new foundation was completed last week.

The Reeves Iron Company, of Canal Dover, Ala., signed the Amalgamated scale last week, and have resumed operations. The concern is a small one, giving employment to about 100 men.

Keel Ridge Furnace, of P. L. Kimberly & Co., Limited, at Sharon, Pa., has resumed operations after an idleness of some weeks for repairs.

The Whitaker Iron Company, of Wheeling, W. Va., signed the amalgamated scale last week and operations have been resumed. The firm manufactures sheet iron exclusively.

The Ella Furnace, at Middlesex, Pa., has been blown out and is being repaired. A new and much-improved hot blast is being erected, and a new 87-inch cylinder upright blowing engine will be placed in position and will take the place of the present engines. The Ella was built for a 90-ton per day furnace, but has frequently made from 120 to 128 tons per day.

The Henderson Steel and Mfg. Company, of Birmingham, have increased their 1½-ton experimental furnace to 3½ tons capacity. The first melt in the enlarged open-hearth furnace was made successfully on the 22d inst.

The pipe mill of the Reading Iron Works, at Reading, Pa., resumed on Monday after a lengthy idleness with 200 men, the employees having had restored to them 5 per cent. of the 10 per cent. reduction in their wages, made some months ago, with a promise that the other 5 per cent. will be restored soon.

Machinery.

The Webster, Camp & Lane Machine Co., Akron, Ohio, recently shipped one of their hoists, mill, engine and boiler, occupying two cars, to the Sheffield Furnace Company.

The Hussey Re-Heater and Steam Plant Improvement Company, of New York, have under consideration the building of a factory. Hitherto their work has been let by them on contract to outside parties, but the growth in their business has been such as to make it an object for them to manufacture their own goods, and with this in view Mr. Brewer is now seeking a desirable place at which to locate, erect shops and put in a plant. The capital stock of this company is \$100,000, and at the start from 30 to 50 skilled mechanics will be employed. This number will be increased as rapidly as the demand for their machinery will warrant.

Wm. H. Warren, of Worcester, Mass., builder of machine tools, report the following recent sales: To the Union Water Meter Company, Worcester, Mass., one radial drill, weight, 9000 pounds; shaper designed especially to plane brass, and so constructed as to cut 100 feet per minute; also, a new designed two-spindle boring and drilling or milling machine, with spindles at each end of machine, to enter work at each end at same time; to the Atlantic Works, East Boston, Mass., one

radial drill; Brown & Sharpe Mfg. Company, Providence, R. I., fourth radial drill and order for the fifth; Rhode Island Locomotive Works, Providence, R. I., one radial drill; Lane Mfg. Company, Montpelier, Vt., one radial drill; E. Kendall & Sons, Cambridgeport, Mass., one combination slotter, milling and drilling machine.

The National Pipe Bending Company, New Haven, Conn., manufacturers of the National Feed-Water Heater, report their orders for heaters for the last month very satisfactory. Among the heater sales are: One 500 horse-power to New Bedford, Mass.; one 100 horse-power to Willimantic, Conn.; eight heaters to Boston; one 100 horse-power for steam yacht; one 200 horse-power to La Fayette, Ind.; one 100 horse-power and 500 horse-power to New Haven, Conn.; two heaters to Westfield, Mass.; one 80 horse-power to Safford Springs, Conn.; two heaters to Ohio; three heaters to Minnesota, one heater to Dakota, one 500 horse-power to the West Indies; two heaters to Woonsocket, R. I.; one heater to Georgetown, Tex.; one 100 horse-power to Columbia, S. C.; one 200 horse-power to Pensacola, Fla.; one 80 horse-power to Darlington, N. C.; one 500 horse-power to Laredo, Tex.; six heaters to New York City; two 80 horse-power to Yonkers, N. Y.; one 400 horse-power to Edison Electric Company, Brockton, Mass.; and one 200 horse-power to Montreal, Canada. They have orders for one 1000 horse-power, one 600 horse-power, one 500 horse-power, one 300 horse-power, three 200 horse-power, all to be shipped before September 15; also orders for nearly 200 coils of iron pipe.

D. B. Cruickshank, dealer in machinery, Providence, R. I., reports the following sales of machinery: An 80 horse-power Corliss engine to the new Russell Gold Mining Company, Glenbrook, N. C.; a 15 horse-power hoisting engine and boiler to Whitaker & Smith, Fall River, Mass.; a 10 horse-power hoisting engine to Grant & Co., Westerly, R. I.; a 20 horse-power engine and boiler to the Arlington Mining Company, Arlington, R. I., and an 80 horse-power Wheelock engine to B. B. & R. Knight, River Point, R. I.

Miscellaneous.

The Youngstown Car Mfg. Company, of Youngstown, Ohio, have closed down their works for a short time for the purpose of making repairs and adding improvements that will considerably increase their capacity for production.

The Carondelet Zinc Works, in St. Louis, were sold to Chas. D. McCloose for \$16,000.

Hardware.

The works of the Newcastle Wire Nail Company, at Newcastle, Pa., are being operated to their utmost capacity in order to keep up with the demands made on the company for their goods. Their works contain 65 nail machines, which are all in constant operation, and this number will shortly be increased by the addition of a number of new machines, which have just been ordered from abroad.

Messrs. Kreamer, Muir and Mitchell, the committee of adjusters appointed by the 38 insurance companies in which the Reading Hardware Company were insured, met the officers of the company and settled the claim. There were 41 policies, aggregating \$205,000, upon 29 subjects of insurance. The loss was confined to 17 of these subjects, on which the insurance amounted to \$170,110, and the total loss on 13 of these subjects aggregating \$155,710, was settled. The work of rebuilding will now be commenced by L. H. Focht, and is to be finished by January 1.—*Reading (Pa.) Times*.

The Iron Age

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Foreign Iron and a Revival Here.

Lately a somewhat better tone has developed in the iron markets abroad, and those who are operating on the bull side have been making strenuous efforts to secure co-operation on this side of the Atlantic. Proposals to get up pools in Scotch warrants on a 10 per cent. margin have been made, with the object of booming the Glasgow market with the fiction that heavy buying for consumers has again begun. It is argued that with an American demand, added to other encouraging features in the situation, prices cannot help moving upward, while, without aid from us, the course of values is uncertain, with little prospect of a very rapid rally.

The wily Scotchmen who calculate in the manner indicated understand pretty thoroughly what a valuable customer the United States is when enjoying one of its spurts of activity. The following table will illustrate this fact. It gives the English exports for the first seven months to all countries, the exports to the United States during the same period and deducting the latter from the former, the exports to all countries except the United States:

<i>English Exports of Iron and Steel, Gross Tons.</i>			
Pig iron:	1887.	1888.	
All countries.....	650,688	608,279	
United States.....	249,972	90,222	
Countries outside U. S.	400,726	518,057	
Bar, angle, bolt and rod:			
All countries.....	143,686	173,989	
United States.....	1,651	3,091	
Countries outside U. S.	142,035	170,878	
Railroad iron and steel:			
All countries.....	459,915	597,429	
United States.....	92,941	39,723	
Countries outside U. S.	466,974	557,706	
Hoops, sheets, &c.:			
All countries.....	180,102	231,756	
United States.....	17,330	21,723	
Countries outside U. S.	171,772	210,033	
Tin plates:			
All countries.....	207,435	225,016	
United States.....	156,738	167,882	
Countries outside U. S.	50,697	57,134	
Cast and wrought, n. e. s.:			
All countries.....	208,889	247,770	
United States.....	1,721	2,798	
Countries outside U. S.	207,168	244,974	
Steel unwrought:			
All countries.....	180,388	90,191	
United States.....	150,169	42,219	
Countries outside U. S.	30,169	47,972	
Old material:			
All countries.....	176,346	82,503	
United States.....	133,125	13,556	
Countries outside U. S.	43,221	68,947	

Taking the whole tonnage, it declined only from 2,325,029 tons to 2,257,013 tons in spite of the fact that the total exports to the United States fell off from 803,674 tons to 381,212 tons. In other words, the great falling off in the shipments to this country has been nearly compensated for by better business in other quarters. The falling off has of course been most marked in pig iron, railroad iron, crude steel and old materials, notably in the case of the latter two. It is evident, therefore, that the English market, so far as exports in-

fluence are concerned, is getting into the shape where they can hold their own even without our buying, and that they would show a rising tendency if we were to become buyers again to any considerable extent. Of that, however, there is little prospect. Prices here are below the importing point, so far as the greater part of our territory is concerned, in nearly all lines in which a large importing trade was done last year. Foreign makers cannot touch Bessemer pig except under special circumstances, and the demand for rails is so light that there is no danger of importing pig, or blooms or rails. In mild steel, for slabs and billets, our own works, at low prices, are still taking practically all the business there is. In old material the situation is a little different. While we are still considerably below the importing point the scarcity, with the winter close upon us, and little renewal work going on, is likely to grow more marked as the season advances, and the coming of foreign old rails in some quantity is not beyond the range of possibilities.

Another point is worthy of notice. With a heavy outward grain movement, which the poor crops abroad make likely, freights to American ports are likely to come down. If they should decline enough, it is possible that steel in some quantity may again be sold for this country.

As matters stand, there is room for a moderate advance here without opening the gates for large quantities of foreign goods. From that quarter we are reasonably safe so long as an upward movement here does not obtain too much impetus. The whole situation does not warrant the expectation of a rapid rise, especially not along the Atlantic seaboard, where the revival in some lines in the Western iron trade has found only a mild echo.

Trusts and Combinations.

There is very great need during the present active discussion of industrial affairs of a far clearer understanding of the meaning and scope of the terms "trust" and "combination." In the speeches of statesmen and economists, in the debates of Congress, in the discussions and comments of the daily press, we meet with the same careless use of the terms. In fact, the point has been reached when every trade association is branded with the name of "trust." This lax use of the term may possibly lead to serious consequences, and it is the duty of those engaged in manufacturing enterprises to vigorously protest.

It is useless to deny that public opinion sees in the modern trust a serious menace to the country. That feeling is now finding expression in tentative efforts to devise some means of providing safeguards by legislative action. Some restrictive measures have been passed, others are contemplated and it is only too easily possible that harsh and sweeping laws may be sanctioned which may prove seriously embarrassing. They are only too likely to strike more heavily those who have not followed the methods complained of. We have repeatedly stated, and we insist again, that the principal characteristic of the modern trust is that those who enter it as manufacturing concerns surrender their identity. As the trusts are organized a manufacturer or a corporation

receive a pro rata quantity of stock, and as managers of their business give over their power absolutely to an autocratic board of trustees. The latter control the purchase of raw material and the sale and the prices of product, decide arbitrarily whether or not particular works shall continue to operate, and fix finally the distribution of profits. The aim is confessedly to remove the very elements in ordinary combinations which have constituted the protection of consumers, and which have caused the public to look leniently upon the associations of manufacturers which have existed in one or another form for centuries and in all countries.

So long as some latitude was allowed to individuals, as in the ordinary combinations, their career, with few exceptions, was short-lived. The greater their abuse of power the quicker, generally speaking, has been their downfall, the longer the period of unbridled competition following it. The result has been that manufacturers have learned to look upon the time of their existence as a period of truce during which to make active preparations for subsequent war. In many instances, too, they have turned out to be nothing more than a special opportunity for those who were least scrupulous in seizing every chance for a breach of good faith. It is an open question with many manufacturers whether in the long run combinations do not do them as much harm as they do good. The majority look upon them as temporary expedients at best to tide over periods of restricted demand.

In a few cases they may do injustice to consumers for a limited time, but, on the whole, they only secure to the manufacturers what every reasonable buyer will concede to them—a fair return on capital invested and for risks taken. The most serious error the managers of combinations can commit is to abuse what power they possess to extort excessive profits, since it surely offers a temptation to outside competition, with all the waste and loss unduly large extensions of producing facilities imply. It is this danger, fully appreciated by manufacturers, which protects the consumer, and has caused him to look upon their formation with some indifference, and certainly without a sense of being menaced.

It is different with that latest phase of industrial development, the modern trust, with its aggregation of enormous capital, wielded by a few men absolutely without responsibility even to their associates in business, crushing competition, extorting special favors from common carriers, and laying under tribute the consumers of a continent. There is a wide difference between such organizations which absolutely stifle competition and the ordinary trade combinations which aim to regulate it. This distinction should be clearly and distinctly recognized. Thoughtful business men have long inclined to the opinion that unbridled competition is far from being a blessing either to the consumer or the producer. If its waste and extravagance can be lessened without prejudice to the consumer the methods adopted deserve the support of the public. With all their faults the ordinary trade combinations tend to that end, and a wholesale condemnation of them as "trusts" would be unjust and full of harm to the best interests of the country.

How little this distinction is understood even in Congress is shown by the "anti-trust bills" lately introduced. Their aim is to punish the alleged offending industries by abolishing or reducing the duties. Among those so treated we find the steel rail manufacturers, whose "trust" was unable to permit a decline from \$40 to \$28.50 in the price in one year. Another "trust" which will more calmly look upon the proposed action is the copper interest, which is to be curbed by abolishing the duty on ore and on ingot. To them the measure will cause little grief, since it is a matter of absolute indifference to the producers of the raw material whether or not there is a duty on metal or not. As the largest contributors to the world's markets, prices have for years been regulated by the latter, and the duty is of as little consequence as the duty on wheat. The only method of meeting the trouble would be to deny the producers the right to sell their product to foreign speculators.

The measures proposed clearly establish the ignorance of industrial affairs on the part of those who have brought them forward. Still, they are a menace to the manufacturing interests of the country, which can be removed only by vigorously insisting that trade combinations are far from being "trusts."

The Western Pig Iron Trade.

The month of August has witnessed an exceptional condition of activity in the Western pig iron trade. It is about the usual time for the manufacturers of agricultural implements to place their orders for material to cover their estimated requirements for the ensuing 12 months, and the manufacturers of malleable iron castings have, to a great extent, the same custom. Other consumers of pig iron, however, purchase according to their current wants, or, within certain limits, are governed by the condition of the pig iron trade, except the car-wheel makers, who buy largely in January. This year a peculiar conjunction of events brought about a widespread buying movement which seemed to culminate in August. Almost all classes of customers were represented among the buyers, from those who mainly use charcoal pig iron down to the seekers for the cheapest grade of coke pig iron. The buying movement in the general trade appears to have been started by the rolling mills and pipe foundries, from whom it rapidly extended to other classes of consumers.

The market for mill pig iron was seriously weakened in June, when the Western millowners began to make preparations for a long stoppage of operations, which they believed would follow an expected disagreement with their workmen over the scale of wages. In anticipation of that event they purchased just enough material to last through June, so as to have no stock on hand when they should shut down. This necessitated heavy purchases of pig iron in the latter part of July, when the controversy over wages was abandoned by the manufacturers. At the same time the large cast-iron pipe works began to absorb enormous stocks of the same grade of pig iron. Other consumers of cheap

iron also laid in stocks, as the price seemed to be as low as could reasonably be expected under existing conditions. The movement then took in a wider range of buyers, who were quick to perceive the growing scarcity of cheap iron, and were ready to place orders for a reasonable time in the future whenever they felt certain that the downward tendency in prices had been checked. Some of the Chicago furnace agents found their August trade in foundry pig iron the heaviest they had ever experienced for this season. Even small foundries have placed orders to cover their entire wants for the remainder of the year.

In the very nature of things this activity could not be expected to continue, and, while here and there will be found a furnace agent in receipt of good orders from a few belated buyers, it is highly probable that a period of comparative dullness may again be seen. The furnaces being in good shape now, with their output sold ahead for a considerable extent, prices can easily be sustained at present figures, unless other furnaces are blown in whose product will have to be forced on the market. The slight advance in price noted in our market reports, on a number of brands of Western pig irons, has usually been confined to those selling under what might be considered the normal rate. Other brands have steadily been held at this rate, and their prices have not been advanced. Contracts for such brands, when not sold up, can still be placed at their old price.

The outlook is therefore by no means in favor of a "boom," unless the railroad companies should enter the market and make liberal purchases of all kinds of material. Many of them need to do so, it is true, but they are restrained by the condition of their balance sheets. Heavy traffic this fall, in consequence of the large crops and the expected early export movement toward the seaboard, may very materially change their financial condition, when they would, of course, alter their policy of the utmost economy in all purchases of material. Whether this will be the case or not requires the gift of prophecy.

The present condition of the Western pig-iron trade is fairly satisfactory to the manufacturers possessing good furnace plants, well located and prudently managed. Although prices are considerably lower than they were a year since, the cost of labor, coke, iron ore and transportation has been reduced also, and the manufacturers in but few localities are complaining of their inability to obtain more than mere cost for their product. Those who complain are usually so situated that they are compelled to seek distant markets in which to dispose of their pig iron, and in which they are obliged to meet the competition of local makers. During the latter part of last year and early in the present year the decline in the price of pig iron was so rapid that the Western makers generally, who had time contracts for coke and iron ore, were unable to reduce cost fast enough to keep the balance on the right side. But this has now been remedied, and even if prices do not advance beyond their present figures, the improved position of the trade conduces to decided cheerfulness among the manufacturers.

Late Developments in Peru.

The distress in general finances and the deadlock in monetary affairs in Peru have become such since the commencement of the year that something has to be done to enable the country to emerge from its crisis of impoverishment. This is all the more to be desired since considerable foreign interests are involved, among them being those of American railroad contractors. Fortunately for all interested, a favorable change is at length at hand, through the revival, in better shape, of the Grace contract on behalf of the Peruvian bondholders. It is hoped that through a joint arrangement the railroads belonging to Americans, now confiscated, will be released.

Negotiations have been going on at Washington between our State Department and Don Cipriano Zegarra, the Peruvian plenipotentiary, about those railroads, since June last. In April, notwithstanding the firm position assumed in the matter by our Legation at Lima, a decree was issued by the Peruvian Government declaring that the contractor for the Southern railways of Peru, those connecting the Pacific with Lake Titicaca, should immediately turn over the administration and plant to the Government officials, and that an investigation of the responsibilities entered upon by Mr. Henry Meiggs, the original constructor, and Mr. T. L. Thorndike, the present contractor, should be made so as to establish the obligations existing. The same had already been done with regard to the Salaverry and Trujillo Railway, under contract to Mr. E. C. Du Bois, a citizen of the United States. The Oroyo Railway is contracted for by Mr. Michael P. Grace, and although similar action was attempted in the Peruvian Congress, it was not successful. All of these contracts were constituted legally, with the approval and sanction of the established Governments. The contractors are creditors of Peru and claim the right to retain possession of the railways as a guarantee for the payment of the sums due them. Should the Grace contract in its new form be accepted by Peru, this would facilitate matters very much, as the question could be satisfactorily arranged between the bondholders and the contractors.

Lord Donoughmore is on his way to Lima accompanied by Mr. Michael P. Grace, brother of the ex-Mayor. Lord Donoughmore is the representative of the English bondholders of Peru; he has the well-earned reputation in England as a man of solid political attainments in the House of Lords, and of excellent business capabilities in the city of London. The capital which the holders of Peruvian bonds have tied up is about £54,000,000, or, in round numbers, about \$250,000,000. Lord Donoughmore and Mr. Grace will work hard to settle the debt on the basis of the Tyler-Grace-Nanibar contract of May, 1887. That contract was not submitted to the last Peruvian Congress because of certain objections raised by the Chilean Government. These objections, the British syndicate have reason to think, are overcome, and the two gentlemen hope to have the contract sanctioned by the Peruvian Congress now in session. By this contract the English bondholders will surrender their bonds and so cancel the

external indebtedness of Peru. The latter in return gives the bondholders her national railways and certain grants of national agricultural lands and certain mines. The bondholders agree to complete the roads and maintain them in perpetuity.

The mining rights are understood to extend over a series of years. The property includes silver, coal and cinnabar mines, the development of which will require ready capital. The syndicate will be allowed to mortgage their property up to £6,000,000, or \$30,000,000. The railways are expected to yield £80,000 a year. The grant of land for colonization is 1,800,000 hectares, or about 70,000 square miles. The syndicate property is to be free from taxation, and whatever may be imported by the agents of the syndicate to carry out the plans of perfecting the railroad system, &c., &c., is to be free from duty. Peru covers an area of 1,049,270 sq. km. and has a population of 3,000,000, including 350,000 wild Indians and 20,000 white foreigners, and besides 50,000 Chinese. The chief cities are Lima, with 101,488 inhabitants; Callao, 33,502; Arequipa, 29,237; Cuzco, 18,370, and Chiclayo, 11,325. The public indebtedness stood, on July 1, 1886, as follows:

Foreign debt.....	\$257,115,940
Home debt.....	27,800,000
Paper money in circulation.....	88,541,000

Total.....\$373,456,940

The paper money has become nearly worthless, but will of course rapidly appreciate again should the settlement with bondholders be carried to a safe issue this time. On this point no serious doubts seem to be entertained. In both mineral and agricultural resources, Peru is inferior to but few, if any, countries of similar size in South America. If, therefore, public confidence and credit can be restored in the manner proposed and new life and enterprise infused, the country may again flourish long ere this century comes to a close.

Mad Mathematics.

The New York *Evening Post* of August 11 contains a letter on "The Crippled Iron Industry," of which we give the essential part.

The writer quotes (we do not know how correctly) from a Southern journal this paragraph:

At a meeting of the American Mining Engineers at Birmingham last week Mr. W. M. Bowron, manager of the South Pittsburg Division of the Tennessee Coal, Iron and Railroad Company, showed by a closely itemized statement, allowing 3 per cent. for repairs and 6 per cent. for interest, that iron could be made in the Birmingham district at \$9.04 per ton.

He then gives the market prices of pig iron at Cincinnati, as follows:

Ohio and Southern strong coke,	
No. 1.....	\$17.50 @ \$18.00
Ohio and Southern strong coke,	
No. 2.....	16.50 @ 17.00
Ohio and Southern strong coke,	
No. 3.....	16.00 @ 16.50
Southern car-wheel iron....	20.00 @ 23.00

and continues the argument thus:

Upon inquiry I learned that the freight from Birmingham to Cincinnati is from \$3 to \$3.50 per ton, carload lots. Now, we will figure a little, and see how badly the iron and steel interests are being "crippled."

Taking the lowest grade (No. 3) at the lowest price, and adding the highest rate of freight, we have a margin of \$3.46 per ton, a neat little 38 per cent. The No. 2 grade, figured the same way, shows a profit of \$3.96 per ton, a fraction

less than 44 per cent., and the No. 1 \$4.96, a small fraction less than 55 per cent. All this, mind you, on outside rates of freight and the lowest prices quoted for the various grades. If the "car-wheel iron" can also be produced for \$9.04 per ton it pays, at \$20, a profit of 82½ per cent. It's a pity we can't all have "infant industries," if this is a sample, and it is usually supposed to be the one needing the most protection.

On this remarkable calculation we make no further comment than to state the following facts:

1. Mr. W. M. Bowron, who read the paper at Birmingham referred to, is not connected with the Tennessee Coal and Iron Company.

2. His paper did not discuss, directly or indirectly, the cost of pig iron in the Birmingham district. It referred exclusively to the Sequachee Valley in Tennessee.

3. The cost named by him, in an estimate avowedly not representing any actual existing works, was not \$9.04, but \$9.66 per ton.

4. The ton referred to was the "short" ton of 2000 pounds, whereas the ton in the market quotations is the "long" ton of 2240 pounds, plus an allowance for "sandage," which, on Southern irons, may bring the market ton to 2300 pounds—2268 being, we believe, a minimum.

The *Post* correspondent has, therefore, based his argument on an erroneous quotation, the wrong rate of freight and the wrong ton. It would seem difficult to introduce any further error; but the concluding allusion to car-wheel iron achieves that feat. On this head, we content ourselves with remarking mildly that car-wheel iron does not pay 82½ per cent., and we will leave this ingenious investigator to find out the reason.

The Use of Private Freight Cars.

Representative Lawlor, of Illinois, has introduced a bill in Congress which is of great importance to iron and steel manufacturers in many parts of the country. It is intended to form an amendment to the Interstate Commerce act, and forbids the use of any other freight cars than those owned by railroad companies themselves. Of course, private cars are used by a vast number of shippers besides iron and steel manufacturers, and all of them are equally interested in this question. It has been found desirable for a variety of reasons for shippers to own their cars whenever they had a large trade in bulky articles at regular points. Among iron and steel manufacturers the custom has grown rapidly within recent years, partly because the largest works have concentrated the purchase of supplies of raw material at certain points, making the use of private cars a possibility, and partly because the railroad companies have frequently been unable to supply their patrons with all the rolling stock needed.

The large steel rail companies of the West, depending largely for their supply of coke on the Connellsville region, have provided themselves with sufficient freight cars to carry their stock to them with the utmost regularity. In times of activity they use such an enormous quantity of coke daily in the manufacture of pig iron that they need almost the entire equipment of a good-sized railroad company kept in constant motion on their account alone. If a freight blockade occurs last-

ing several days or a week the operations of their furnaces are affected, as a sufficient stock of coke is rarely accumulated to tide over such an emergency. If the railroad companies furnished the rolling stock used in hauling coke, freight blockades would be much more frequent than they now are, and facilities would often be so inadequate that manufacturers would be obliged to bank up their blast furnaces, with great inconvenience to other departments of the works and serious loss to the owners.

It has been shown since the Interstate Commerce act has gone into operation how in some lines of business small operators have been practically driven from the field by advantages accruing to large competitors, partly through the use of their own cars. A measure intended for the relief of such shippers should be so framed as to apply to just such cases, and by no means should be made so sweeping as to work injury in other quarters. Establishments of great importance depending upon the regular receipt of supplies of raw materials for their steady operation, and to secure which they have been obliged to provide a large number of their own freight cars, should not be classed with shippers who have acquired the ownership of freight cars for the purpose of securing a commercial advantage over weaker competitors. If Mr. Lawlor's bill should receive favorable consideration and become part of the Interstate Commerce act, much confusion and great inconvenience would be experienced by many iron and steel manufacturers whenever the railroads of the country again become crowded with business.

Some of the largest and finest pieces of casting ever turned out in Reading have just been completed at the Meller Foundry and Machine Works. They are four Corinthian columns, 26 feet high, 26 inches in diameter at the base and 21 inches at the top, each weighing between 6500 and 7000 pounds. They are intended to support the tower of St. Joseph's Catholic Church, now being erected at Martinsburg, W. Va. The capitals for the columns are of zinc and were made in Salem, Ohio.

The Buffalo Forge Company, Buffalo, N. Y., last week secured a contract for furnishing forges, blowers, exhaust fans and ventilating appliance for the School of Mechanical Engineering, Vanderbilt University, Nashville, Tenn., and are at present working on similar orders from the University of Tennessee, Knoxville, Tenn., and Miller Manual Training School, Crozet, Va., and the State Technological School at Atlanta, Ga.

The Pennsylvania Railroad Company have begun suit in New York against the Arthur Kill Bridge Company for \$5,000,000 damages. The bridge is being built by the Staten Island Transit Company and the Baltimore and Ohio Railroad Company. The Pennsylvania Company claim that the bridge is not constructed upon approved plans, and is a hindrance to navigation, many of their boats having been damaged by being swung against the abutments.

In order to exhibit the resources of Utah most effectively the Chamber of Commerce of Salt Lake have fitted up a rail car in a sumptuous manner, and arranged therein a great variety of specimens representing undeveloped wealth. The car was first sent to St. Louis.

CORRESPONDENCE.

Prices on Pipe Fittings.

GALVESTON, TEXAS, August 18, 1888.

To the Editor: In these days, when manufacturers are making and revising price lists of all kinds, it would be well for those interested in the pipe-fitting trade to arrange a uniform price list on fittings. To illustrate the variations in prices, I inclose a table showing the different schedules of prices made on the one line of malleable elbows:

Elbows.	A	B	C	D	E	F	G	H
Inches.	Chicago.	Chicago.	Chicago.	St. Louis.	St. Louis.	St. Louis.	Boston.	New Orleans.
1/2	.04	.04	.04	.04	.04	.04	.05	.05
3/4	.04	.04	.04	.04	.04	.04	.05	.05
1	.05	.05	.05	.05	.05	.05	.07	.07
1 1/4	.06	.06	.06	.06	.06	.06	.09	.09
1 1/2	.10	.09	.09	.09	.09	.09	.15	.15
2	.16	.16	.13	.16	.13	.16	.22	.22
2 1/4	.23	.21	.20	.21	.20	.23	.32	.32
2 1/2	.34	.32	.25	.32	.25	.32	.38	.38
3	.52	.45	.40	.45	.40	.50	.60	.60
3 1/4	.80	.72	.75	.72	.75	.75	1.25	1.25
3 1/2	1.50	1.40	1.10	1.40	1.10	1.40	1.75	1.75
4	2.00	2.00	1.35	2.00	1.35	2.00	2.10	2.10
4 1/2	3.00	2.80	1.80	2.80	1.80	2.80	4.00	4.00

C and E are alike, B and D are alike, G and H are alike.

This is just a sample of the wide variations which run through the whole price list. You will note that there are three different lists used by different houses in Chicago and three in St. Louis. The pound price list is more nearly uniform.

Yours, &c., JNO. W. THOMAS,
Purchasing Agent, Gulf, Colorado and Santa Fé Railway Company.

Influence of Aluminium on Cast Iron.

BRANFORD, CONN., August 27, 1888.

To the Editor: The paper with the above title, which was read at the Cleveland meeting of the American Association for the Advancement of Science and printed in the August 23d edition of *The Iron Age*, must have attracted undue attention, and we have much to thank Messrs. Keep, Mabery and Vorce for in their efforts to substantiate and systematize our fragmentary information. The mechanical part of these experiments was conducted with such evident carefulness, and the results were presented graphically in such an intelligent manner that it is to be regretted that, in the place of dealing with an alloy containing 8.86 per cent. of silicon, they did not conduct their trials using metallic aluminium alone. These remarks are of necessity in the form of a criticism, but are submitted with a view to calling attention to a factor in the problem which seems to have been forgotten, and with the hope that further discussion may bring to light additional information. The ferro aluminium used contained 3.86 per cent. of silicon and 11.42 per cent. of aluminium, and in order to introduce the desired percentage of aluminium into the iron experimented with it was inevitable that a certain amount of silicon would also be added, and this too in quantities, though looking small when reduced to per cents, yet large enough to materially influence the results. The effect of silicon upon cast and malleable cast iron has been with me the study of years, and I know that some of the very effects noted by Messrs. Keep, Mabery and Vorce and credited by them to the influence of aluminium might have been caused by the silicon. The carbon in cast iron containing less than 1.25 per cent. silicon and low in manganese is surprisingly sensitive to the least increase or diminution of the silicon, even two-hundredths of 1 per cent. making, under favorable conditions, an appreciable

difference. Using an alloy containing 11.42 per cent. of aluminium and 8.86 per cent. of silicon for introducing into 30 pounds of metal 0.28 per cent. of aluminium, you would also introduce 0.077 per cent. of silicon, and the addition of the latter element would, in all probability, render it very unsafe to draw conclusions touching the precise effect produced by the aluminium alone. The cast iron may have contained not quite enough silicon to coax or force the combined carbon into a graphitic or semi-graphitic form, and the addition, under these conditions, of 0.077 per cent., or even less, of silicon, would be expected to alter very decidedly all of the mechanical and many of the chemical properties of the iron. Not but what the aluminium will do all and more, than is claimed, but before these claims can be scientifically established it will be necessary to disassociate it from the silicon entirely and then calculate its influence alone. The subject in the article referred to is treated under the following heads:

- "The Solidity of Castings and the Formation of Blow Holes."
- "Does the Aluminium remain in the Iron to exert an Influence when the Iron is Remelted?"
- "The Effect of the Aluminium upon the Grain, or the Changing of the Carbon from the Combined to the Graphitic State."
- "The Taking Away the Tendency to Chill."
- "The Prevention of Sand Scale."
- "The Effect upon Hardness."
- "The Resistance to a Load Gradually Applied, or a Dead Weight."
- "The Resistance to a Load Suddenly Applied, or the Impact."
- "The Elasticity."
- "Permanent Set."
- "The Effect upon the Shrinkage of Iron."
- "The Fluidity of the Melted Metal."

In order to make the point of my criticism more clear, I will follow the order here laid down and remark, first, under the head of "the solidity of castings and the prevention of blow-holes," that it has not yet been my good fortune to see any "Mitis iron"—wrought-iron castings containing a small percentage of aluminium—that was solid and free from blow-holes; but, on the contrary, all the specimens that have come to my notice, and all that I have now before me, are full of blow-holes of the most pronounced type; and the defect has been serious enough—even when the metal was melted in crucibles, and run into baked fire-clay molds, to cause the complete financial failure of at least one concern in this country. But, in the case in hand, it would be natural to expect that the addition of the aluminium silicon alloy would decrease the tendency of blow-holes and porosity, for the action of the silicon alone would be in this direction, as every one knows who has studied the Terre-Noire process or any of the solid steel casting processes in this country.

In the "Mitis iron" an alloy of aluminium, iron and silicon was also used, and the partial prevention of the blow-holes may have been due more to the silicon than anything else.

"The effect of aluminium upon the grain, or the changing of the carbon from the combined to the graphitic state, and 'the taking away the tendency to chill.'" In this connection it would seem to me impossible to ascertain the effect of aluminium when introduced in combination with silicon, for when the carbon is near the balance—that is, near the point where it will readily assume either the graphitic or the combined form—it will manifestly require but a slight change in the proportion of silicon to throw it one way or the other; the silicon being increased, the carbon would tend to separate in the graphitic form, changing the grain and of course decreasing the tendency to chill. The composition of the iron experimented with in this case was as follows: $Si = 0.186\%$; $P = 0.263\%$; $S = 0.3\%$; $Mn = 0.092\%$.

It is stated that the addition of three-fourths of 1 per cent. of aluminium caused the carbon to separate in the graphitic form. Now, in adding enough of the alloy before mentioned to introduce this 1 per cent. of aluminium, it was necessary to introduce 0.254 per cent. of the silicon, and this, added to the 0.186 per cent. silicon that the iron originally contained, makes the total silicon 0.44 per cent.—quite enough under favorable conditions to permit the carbon to assume the graphitic or semi-graphitic form, and quite enough also to account for any decrease in the chilling property. As far as it was tried—up to 4 per cent.—it was found that the iron became softer and grayer as the aluminium was added, and this would naturally follow from the silicon introduced, which, in this case, would have been about 1.35 per cent., making the total silicon in the iron about 1 1/4 per cent. So likewise with the tests for "resistance against dead weight," "impact," "permanent set," "shrinkage" and the "fluidity" of the melted metal, the silicon introduced every time would produce the same effects under right conditions as those noted, so that even if the aluminium acted in a like manner, no such conclusion could be drawn from tests when an alloy containing silicon is used. Possibly the facts are as Messrs. Keep, Mabery and Vorce have stated, and it may be that they have made other trials which have anticipated the direction of my criticism. If such is the case they would place their co-laborers under even heavier obligation to them by publishing such facts, thus making a valuable addition to the world's metallurgical knowledge.

ALFRED E. HAMMER.

The Mission of Mechanical Engineering Schools.

NEW YORK, August 15, 1888.

To the Editor: It is only this day I note Mr. Hawkins's letter in your issue of the 2d inst. Whether I have set up, as Mr. Hawkins maintains, a "man of straw," or whether I have conclusively shown the fallacy of Mr. Hawkins's real argument, as I believe I have done, can be best judged by the unbiased reader, interested, by a perusal of our two addresses in full, not by reading extracts from either. Mr. Hawkins's paper is published complete in the Transactions of the American Society of Mechanical Engineers, 1888 (and probably elsewhere), mine in the *Sterens Indicator* of July 15, 1888, and in *Science*, June 22, 1888.

I think I have clearly shown the reasons why the printing press can legitimately come in for but comparatively little attention in the technical school, and certainly not at the expense of any time or study now devoted to the prime movers, notably the steam engine. This position I have taken not in the "spirit to defend at every point" my *Alma Mater*, nor indeed on account of any special loyalty to technical schools in general, but simply as being my unbiased conviction, derived from careful consideration and study of the subject.

Indeed, I fear Mr. Hawkins is too apt, the moment his views on technical schools are attacked, to conclude and proclaim that it is due to inborn prejudice on the part of the professors of engineering or of the engineers who have enjoyed a technical school training, instead of carefully considering whether his views, and not the party attacking them, may be at fault.

At the same time I realize that Mr. Hawkins has really the friendliest intentions toward the technical schools, and that on these questions of technical training honest differences of opinion may exist among men who have given the matter some attention. As a fact, this was clearly intimated in my address, which was conceived and written in a spirit of fairness. I should have left

Mr. Hawkins's letter unanswered, were it not for his imputation to the contrary, to which I decidedly object.

As it is, the purpose of these lines is merely to ask the unbiased readers interested to read both papers in full before reaching any conclusion, confident that when this is done they will not consider that I have demolished a "man of straw," as Mr. Hawkins is so ready to assert, but rather that I have demolished the erroneous argument advanced by Mr. Hawkins in his paper read before the American Society of Mechanical Engineers, May, 1888. ALFRED R. WOLFF.

A New Method of Making Copper Pipes.

The disastrous explosions of brazed copper steam pipes which occurred on the Elbe and Lahn have directed the attention of engineers to the subject of the strength and reliability of brazed pipes. Mr. W. Parker, chief engineer surveyor to Lloyd's Register, presented, at a recent meeting of the Institution of Naval Architects, a paper, in which not only is given a scientific explanation of the cause of these failures, but a remedy is also pointed out. Mr. Parker, after referring to tests made with a portion of the steam pipe of the Elbe, and citing the experiments made by the Franklin Institute relative to the decrease of strength in copper at high temperatures, comes to the conclusion that even at the temperature of 360° F., corresponding to steam at 150 pounds, the pipe should still have had a factor of safety at 8½; and that the true explanation of the explosion must be sought in a local injury of the material during the brazing operation. He found that the copper becomes perfectly brittle at a temperature only slightly exceeding brazing heat. In this condition the pipe might be accidentally cracked, and although the section of the metal still remaining intact might be sufficient to withstand the cold water test, yet subsequent use with hot steam might develop the crack, and the pipe ultimately gives way at the working pressure. About the various remedies which have been suggested or tried to increase the strength of such pipes, the author gave no opinion; but he brought under the notice of the institution a new process of manufacturing copper pipes, by W. Elmore, which require no strengthening.

We quote from the paper as follows in regard to the details of this process: A mandrel is surrounded by ordinary unrefined Chili bars arranged upon strong supporting frames in a depositing tank of sulphate of copper, and the copper is dissolved or decomposed, as will hereafter be explained, and is deposited in the form of pure copper on the revolving mandrel, leaving the copper in the form of a shell or pipe of any thickness required, fitting closely to the mandrel. When the required thickness has been deposited the pipe and mandrel are exposed to the action of hot air or steam, then the copper expanding more than the iron admits of the mandrel being drawn, leaving the copper in the form of a pipe, without a seam, perfectly round and true both internally and externally, or the pipe may be expanded or made larger by rolling or other mechanical means, and then the mandrel withdrawn. The deposition of copper by electricity is not at all new. It has been in use for years for electrotyping purposes, and for separating copper from its impurities, and particularly for extracting gold and silver. But copper thus refined is wanting in cohesive properties, and without some means of increasing its density, which would give to it at the same time both tenacity and ductility, it would in

such a form be useless for mechanical purposes. The ingenious manner in which this difficulty is overcome by the present process constitutes its most important feature.

A burnisher or planisher, composed of a small square piece of agate, being the hardest and smoothest substance suitable and available, is supported upon proper arms and levers, and the agate is allowed to press lightly upon the surface of the copper on the revolving mandrel. The burnisher is caused to traverse from end to end of the mandrel by means of a leading screw at any required speed. After it has traversed the whole length of the mandrel it is automatically reversed, and commences its journey backward. The speed of the revolving mandrel and the speed of the traversing burnisher is so adjusted or arranged that the whole surface of the copper is acted upon by the burnisher, the result being that every thin film of copper deposited upon the mandrel must be separately acted upon, burnished and compressed into a dense and cohesive sheet of pure copper possessing a great amount of tenacity and ductility, as will be seen from the experiments and tests which I have made. The impurities or dross fall to the bottom of the tank in the form of mud, and when washed, dried and smelted in a crucible the gold, silver, &c., contained therein can be easily separated. In fact, during the operation of refining copper from the rough Chili bars the finished article is automatically produced in the form of a pipe, and all the impurities are extracted and can be collected.

While I was present at the works of Mr. Elmore, the patentee of this process, four pipes were made. The mandrels had been revolving in the baths for about 170 hours, and the copper in this length of time had reached a thickness of 0.198 inch. The pipes were taken off the mandrels in my presence, and the ends of the pipes cut off so as to present a portion of the pipes acted upon by the burnisher. The remaining portion, or rough ends, showed the nodules, or rough copper, not acted upon by the burnisher, and was in a completely brittle condition. It is well known that the structure of ordinary electro-deposited copper is purely crystalline, and easily disrupted under stress. The adjoining faces of the crystals, of which the whole mass is composed, appear under the microscope to be separated from each other, and have very slight cohesive power.

In order to show the effect of the burnisher upon the material, I have had the structure of specimens of pieces of copper magnified under a microscope and then photographed. One photo was taken from an ordinary piece of cast copper. A second was taken from a rolled bar of copper. The difference in these two structures is very perceptible, and plainly shows the effect of work in the shape of rolling. A third shows the structure of a piece of ordinary deposited copper not burnished, and a fourth shows the structure of a piece of copper one-third unburnished and two-thirds burnished. From these photos it can plainly be seen to what extent the crystals are reduced in size, and the cohesive power of the material increased.

To describe more in detail how the decomposition of the unrefined copper is effected, and how the deposit takes place, I may state that the unrefined Chili bars are cast into slabs of the required length of the pipe, and these are arranged longitudinally in a wooden tank in such a manner that the faces of the slabs are approximately at equal distances from, and parallel with, the surface of the cylindrical mandrel, both at its sides and underneath it, leaving the upper side open for the burnisher to travel over. The man-

drel is fitted with a properly insulated spindle, running in insulated bearings, and driven by suitable wheel gearing, &c. The whole of this arrangement is immersed, as before stated, in a bath of sulphate of copper. The mandrel forms what is termed the cathode, and the copper bars the anode, of the electric circuit. The cathode is connected with the negative pole of an ordinary dynamo machine, and the anode with the positive pole. When the dynamo is set in motion, an electric current passes through the solution, and the following chemical changes take place. The sulphate of copper is decomposed, and the sulphuric acid is transmitted to the anode, there to attack and dissolve or combine with a quantity of copper equal to that which has been liberated or deposited upon the cathode.

Mr. Parker gave tables of tests referring to pipes made under Mr. Elmore's process, solid drawn, and brazed from sheet copper, from which it appears that in point of tensile strength and ductility the electro-deposited pipes have a great advantage over the other pipes. In Mr. Elmore's pipes the tensile strength varied from 23.22 to 24 tons, and the contraction of the area of fracture from 71 to 82 per cent. In the solid drawn pipes the corresponding figures were 20 to 20.5 tons and 12.8 to 43.6 per cent., while the brazed tubes only showed 14 tons tensile strength, with from 31 to 45.5 per cent. contraction.

Cost of Pipe Fittings.

In an article on molding pipe fittings in this country, contributed by W. D. Forbes to *Engineering*, the following tables are given of the price paid to the men for making cores and molding:

Price for Cores.

Size.	Elbows. Cents per cwt.	Tees. Cents per cwt.
½.....	\$0.10 @ \$0.13	\$0.10 @ \$0.13
¾.....	.10 @ .13	.10 @ .13
1.....	.10 @ .13	.10 @ .13
1½.....	.09 @ .12	.09 @ .12
2.....	.09 @ .12	.09 @ .12
2½.....	.10 @ .14	.12 @ .16
3.....	.10 @ .14	.12 @ .16
3½.....	.14 @ .16	.14 @ .18
4.....	.15 @ .18	.16 @ .18
4½.....	.25 @ .50	.25 @ .50
5.....	.50 @ 1.25	1.00 @ 1.50
6.....	2.00 @ 2.25	2.00 @ 2.50
7.....	2.00 @ 2.25	2.00 @ 2.50
8.....	2.00 @ 3.00	2.00 @ 3.50
9.....	4.00 @ 6.00	4.00 @ 8.00
10.....	4.00 @ 6.00	4.00 @ 8.00
11.....	6.00 @ 10.00	10.00 @ 16.00

The corresponding per flask for elbows and tees each is given as follows, varying with the different sizes:

Size.	Price per flask each, elbows and tees.	Size.	Price per flask each, elbows and tees.
½.....	2 @ 2½	2½.....	3½ @ 6
¾.....	2 @ 2½	3.....	3 @ 4½
1.....	2 @ 2½	3½.....	3 @ 4½
1½.....	2 @ 2½	4.....	4½ @ 5
2.....	2 @ 2½	4½.....	5 @ 10
2½.....	2 @ 3½	5.....	10 @ 15
3.....	2 @ 3½	6.....	12 @ 20
3½.....	3½ @ 5½	7.....	15 @ 20
4.....	3½ @ 5½	8.....	15 @ 25

The men are required to shovel their own sand and dump their molds.

James Acton Miller and C. G. Barnd, of Fostoria, Ohio, have invented a process and have perfected the appliances in connection with it, for the purpose of utilizing natural gas in the manufacture of iron and steel.

The Perkins Lock Company have been incorporated at Cleveland, Ohio, with a capital stock of \$100,000. Geo. H. Robbins and others are the incorporators.

Samuel Noble.

On Monday, August 13th, one of the foremost ironmasters of the South, and of this country, Mr. Samuel Noble, died, after a brief illness, at Anniston, Ala., of nervous prostration, caused by a severe attack of cholera morbus. The *Anniston Hot Blast* has presented the following sketch of his life:

Samuel Noble was born in Cornwall, England, November 22, 1834, of James and Jenifer Ward Noble. He was the fifth of 12 children, seven boys and five girls, of whom ten are now living, the oldest, a boy, having died in childhood. In 1837 his father removed with his family to America, settling at Pottsville, Pa., from which place he afterward moved to Reading.

In 1855 the family moved to Rome, Ga., where the father established an iron foundry, machinery for which two of the sons, Samuel and William, brought by schooner from Philadelphia to Savannah. Their business in Rome grew and prospered, and their plant was from time to time enlarged. During the war they made cannon for the Confederate Government.

Mr. Samuel Noble spent considerable time exploring the iron regions of Georgia and North Alabama, and acquired a thorough familiarity with their character. During his tours of investigation he frequently visited the locality that is now the site of Anniston, and looked upon it as the most desirable of all the places he had seen for the manufacture of iron. He wanted to build a furnace here, but had not the money. Early in 1872 he accidentally met in Charleston, S. C., Gen. Daniel Tyler, who had been an officer in the Federal army during the war.

Mr. Noble and General Tyler discussed the manufacture of iron in Alabama, and the result was the organization, some months later, of the Woodstock Iron Company and the building of the first Woodstock furnace, which commenced operations in 1873. From that time dates the most active and productive period of Mr. Noble's life. Within the succeeding 15 years he compressed the lifetime work of a dozen men, and accomplished results of stupendous magnitude. The history of his life during that time has often been told in the recital of the history of Anniston. The two cannot be separated. Anniston is the outgrowth of that little settlement planted here in 1873 by the Woodstock Iron Company.

It was an ambition of Mr. Noble that Anniston should be a center of education and refinement, and of moral and religious influences, and all religious and educational enterprises received from him the most liberal support and encouragement. Among other deeds of philanthropy, for which he will be remembered in the years to come, was the building of the Boys' Academy and Noble Institute for Girls, erected at an aggregate cost of \$27,000. The Institute for Girls has been in operation two years, and the Boys' Academy opened its doors last fall. Mr. Noble recently endowed these schools with \$5000 each, the income from which (guaranteed by him to be not less than \$400) is to pay for ten scholarships to be awarded to pupils in the public schools, entitling the holders to two years' tuition.

Mr. Noble was essentially and pre-eminently a self-made man. His early educational opportunities were limited, and he started in life with but a meager common-school education; yet his mind in later years was a storehouse of information on all ordinary subjects of human knowledge.

Mr. Noble was an earnest, persistent and uncompromising advocate of the system of Governmental protection of home industries and home labor by the imposi-

tion of tariff duties on imports of foreign-made goods. He believed that the prosperity of a country depends upon the profitable employment of labor and capital, and he believed that without the aid of protection the American workmen would be reduced to the unhappy condition of the impoverished labor of England.

Mr. Noble came of a long-lived family. His father died last January in his 83d year, and his mother is now living at the age of 83. Until the death of his father there had not been a death in the family for 50 years.

In 1861 Mr. Noble married in Philadelphia Miss Christina Stoekel, who survives him. He leaves four children, Mrs. E. E. G. Roberts, Mr. S. E. Noble and Miss Addie and Josephine Noble. His brothers and sisters are Messrs. John, William, George and James Noble, of Anniston; Mr. Stephen Noble, superintendent of the furnace at Irouton; Mrs. J. Donkle, Mrs. S. T. McMillan, Mrs. H. A. Smith, Miss Elizabeth Noble and Miss Mary Noble, all living at Rome.

The funeral services were held on Wednesday, August 15.

Weights on Locomotive Drivers.

In the course of a recent article on the excessive weights which are now being placed on locomotive driving-wheels, the *National Car and Locomotive Builder* says:

Ten years ago the engineers of many railroads used their influence to prevent more than 10,000 pounds being placed on one wheel, and even with that comparatively light weight the indications were that the locomotive caused the greater portion of the wear to the rails. Mr. O. Chanute investigated this subject very carefully some years ago, and he found that with the light weights then in vogue the pressure of the drivers on the limited point where the tire and rail meet approximated closely to the ultimate crushing resistance of the metal. He concluded that from one-half to three-fourths of the rail wear was due to the pressure of the engine-wheels alone. European engineers experimenting in the same direction reached conclusions substantially the same in regard to the wear of rails on the lines they were connected with. When the wear, under the impact of locomotive drivers, was so great with half the weight now often placed on each wheel, the existing state of affairs is likely soon to demand a remedy. Complaints about the rapid wear of steel rails are already highly pronounced on many roads, and the present tendency is to put the blame upon the manufacturer. The prevalence of cold flow of metal on the surface of the rails, and of numerous crushed rail ends on the divisions where locomotives with excessive weight on the drivers are at work, may soon direct attention in another direction.

The tendency constantly is to place increasing burdens upon the locomotive. The cars are every year built heavier and the locomotive must pull the same number or more and make faster time with the trains. Then the boiler has to supply steam for compressing air to operate brakes and signals, and those in charge of the mechanical departments perceive that their engines must soon be able to provide steam for heating the cars and for driving dynamos to generate electricity for lighting purposes. This being the case, there is strong temptation to design locomotives with boilers so large that the weight on two pairs of drivers is too great for the rails. The question then arises, Why not use three pairs of driving wheels and by that means make a better distribution of the weight? A few roads have tried mogul or ten-wheel engines for passenger service, and we see no reason why the practice should not be widely ex-

tended. Before the strike of their locomotive engineers the mechanical department of the Chicago, Burlington and Quincy were for some time engaged on a series of interesting and valuable tests, undertaken to establish the relative efficiency of different types of locomotives in hauling exceptionally heavy passenger trains over an undulating road at a fairly high rate of speed. The best work in handling the train was done by a new mogul passenger engine built at the company's shops and a 10-wheel engine belonging to the Chicago, Burlington and Northern. The latter engine was taken directly out of freight service without any change, and she handled the heavy passenger train admirably, showing that on the level she could keep a train of 12 heavy coaches running at a speed of over 50 miles an hour. This proved that the engine could make speed sufficient enough for all practical purposes; but the leading point of superiority about the engine was the expeditious way in which she could pull the heavy train into speed from the numerous stopping places. The Michigan Central people have been running a ten-wheel Schenectady engine with so much success that on their fastest heavy through passenger trains that they intend getting more locomotives of the same class for the service that has hitherto been so difficult to operate promptly with eight wheelers. Stop or slow up points will always be numerous on our railroads, and the locomotive that can raise the train most quickly into speed will have a decided advantage over those that are designed merely for maintaining a high speed.

Other companies which have tried mogul and ten-wheel engines for heavy passenger service have met with very encouraging results; yet there is a widespread antipathy to placing a locomotive with more than two pairs of drivers in front of a passenger train. There is want of confidence in the safety of this class of engines for high speed that does not appear to rest on the foundation of experience. Men will say that it is not safe to have the heavy rods required for six coupled engines flying up and down at the velocity required for a fast running train; but no one will give particulars of the breakage of rods belonging to that class of engine caused by fast running, for accidents of the kind are scarcely known. The rods and running gear of a six-coupled locomotive may be a little harder to maintain on fast passenger service than the same parts of an eight-wheel engine, but the difference is not sufficient to count against the former type of engines being employed on the work named. We are satisfied, where it is necessary to use 50-ton locomotives for passenger service, that it will be found more economical to place the adhesive weight on three pairs of driving wheels than on two pairs. If the engine is specially designed for fast running, with large wheels, long steam ports, ample bearings and well-proportioned rods, the cost of maintenance will be no more than in the case of overweighted eight-wheel locomotives.

The Freeman Wire Company are about to begin the remodeling of their wire plant. Among other improvements contemplated at the works is the substitution of a 400 horse-power engine, likely of the Harris-Corliss type, for the engines now working, the same to drive both the wire mill and the barb wire factory. They will reopen their main office in this city within a few days.—*Age of Steel, St. Louis.*

David Round & Son, of Cleveland, Ohio, who operate a chain works at Findlay, Ohio, inform us that they have closed down the works for an indefinite period on account of a lack of orders.



SAMUEL NOBLE.



TRADE REPORT.

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St.,
PHILADELPHIA, Pa., August 28, 1888.

Pig Iron.—A firmer feeling has been developed in Pig Iron, and orders for large lots are hard to place. This, however, is due more to the diversion of certain brands to other points than to any improvement in the local demand, although the effect upon prices is the same. Writing from this point, and leaving other correspondents to report their respective markets, it is a matter of regret that we cannot find any material increase in the volume of business in this vicinity. Prices are all firmer, in sympathy with the movements elsewhere, and they will doubtless continue to sympathize with any further movement; but, apart from that, there is nothing in the market to indicate any independent action of its own. There is a scarcity, of course, because a great deal of Iron is being drawn to the West, which, until recently, has been coming this way, while agents of Southern furnaces report that elsewhere they can do nearly \$1 per ton better than in Philadelphia. This leaves consumers dependent upon local furnaces, but for the present they seem able to meet the demand at current rates, and, as a matter of fact, quote precisely the same figures as a week ago, although they discriminate closely in regard to quantity, giving the preference to regular customers. It is now pretty well settled that there is no chance whatever for lower prices this season, and it is by no means certain that an advance of 50¢ @ \$1 per ton may not be realized. All depends upon the continuance of the demand West; if they can maintain their present position, prices here will doubtless work toward a somewhat higher level. Meanwhile, covering both ends of the market, quotations for tidewater deliveries are about as follows: No. 1 Foundry, \$18 @ \$19; No. 2, \$17 @ \$17.50; Gray Forge, \$15.75 @ \$16.50.

Foreign Iron.—There is a disposition to place orders, but the firm tone manifested abroad prevents anything being done at present. Sellers quote \$19.50 @ \$20 for Bessemer, c.i.f., duty paid, but bids are a full dollar below those figures.

Blooms.—A liberal movement is reported in Steel Blooms at figures within the limits quoted below, price according to analysis, &c. Nail Slabs, \$28.50 @ \$29.50; Billets from \$30 to \$35, f.o.b. cars at mill, according to analysis; Charcoal Blooms, \$52 @ \$54; Run-out Anthracite \$42 @ \$44; Scrap Blooms, \$33 @ \$35 per "bloom" ton of 2464 lb. Foreign at tide, c.i.f., duty paid, \$29 @ \$30 for Nail Slabs; \$31.50 @ \$32.50 for 4 x 4 Billets, and \$35 @ \$39 for Siemens-Martin, price according to analysis, &c.

Muck Bars.—There is a good deal of activity in this department, and a large business could be done at about \$27.50, delivered. Holders are firm at \$28 (in some cases \$28.50) delivered, but buyers do not respond freely to the advanced ideas of holders, unless from necessity.

Bar Iron.—A slight improvement can be reported in this department. Several of the mills have taken some good-sized Skelp orders, which with other specialties takes them pretty well out of the market for the present. A somewhat heavier demand for Bars is also noticeable, so that manufacturers are inclined to be a little firmer in their prices. There is also less competition from the West, notwithstanding that Ohio Bars have been offered during the week at extremely low figures.

But, taking the market as a whole, there is doubtless a much better feeling, more business, and as a rule a little better prices, but nothing beyond that. The outlook is considered fairly satisfactory, and prices for the Best Refined Bars are steady at 1.85¢ @ 1.9¢, and Grooved Skelp at 1.8¢ @ 1.82½¢. At the same time, Bars said to be of good quality can be had in round lots at from 1.7¢ to 1.8¢, and a good deal of business has been done at these figures, and comparatively little at the higher quotation, but all depends on what the buyer is willing to accept as a guaranteed quality.

Plate and Tank Iron.—The demand for small lots is well maintained, but mills have not accumulated orders to any important extent, so that prices are still about as they were some time ago. The feeling is improving, however, and there is a general impression that a larger volume of business will be forthcoming during the next three or four weeks, although at the moment nothing of importance is on the market. Prices remain about as before, viz.: Ordinary Plate and Tank Iron, 2¢ @ 2.10¢; Shell, 2.4¢ @ 2.5¢; Flange, 3.5¢; Fire-Box, 4¢; Steel Plates, Tank and Ship Plate, 2.3¢ @ 2.4¢; Shell, 2.7¢; Flange, 3¢ @ 3½¢; Fire-Box, 3½¢ @ 4½¢.

Structural Iron.—No great amount of business has been done during the week, but small orders have come in quite freely, so that the mills about hold their own. Notwithstanding the reported activity in Western markets, the outlook in this vicinity fails to develop anything different to what we have reported for some time past. Still, the feeling is hopeful, and if there is no improvement there certainly is no retrogression. Prices about as follows: 2¢ @ 2.10¢ for Bridge Plate; 2¢ @ 2.10¢ for Angles; 2.6¢ @ 2.7¢ for Tees, and 3.3¢ for Beams and Channels, Iron or Steel.

Sheet Iron.—Although there is an absence of large orders there is enough demand in a small way to absorb pretty much the entire output, and stocks in manufacturers' hands are no larger than in ordinary seasons. Prices for good makes are firmly maintained, but in other cases a good deal of irregularity is reported. Small lots are quoted as follows:

Best Refined, Nos. 26, 27 and 28....3¼ @ 3½¢
Best Refined, Nos. 18 to 25....3 @ 3½¢
Common, ¼¢ less than the above.
Best Bloom Sheets, Nos. 26 to 28....4¼ @ 4½¢
Best Bloom Sheets, Nos. 22 to 25....4 @ 4½¢
Best Bloom Sheets, Nos. 16 to 21....3½ @ 3¾¢
Blue Annealed.....2.8 @ 3 ¢
Best Bloom, Galvanized, discount.....62½ %
Common, discount.....67½ %

Merchant Steel.—The general tone of the market continues strong, and, while prices are not quoted higher, there is a firmness that indicates a confident feeling, and a few weeks more of activity, such as the last two have been, will probably go far toward securing some advance in prices. Manufacturers are regaining confidence and, as a rule, anticipate a large fall trade. Prices are quoted as follows for lots from store: Tool Steel, 8½¢; Machinery, 2½¢; Crucible Spring, 4½¢; Open-Hearth Ordinary Spring, 2½¢ @ 2½¢; Crucible Machinery, 5¢; Best Sheet Steel, 10¢; Ordinary Sheet, 8¢.

Steel Rails.—There is very little change to notice in this department. The demand is chiefly for small lots, and these for prompt delivery. Sales have been made for lots of 1000 to 2000 tons each at \$28.50 @ \$29 at mills, and in the absence of a demand for large lots, these are probably firm quotations.

Old Rails.—An active inquiry is reported for Old Rails, but there are none for sale in this market at prices likely to attract attention. Bids of \$21 @ \$21.25

could be had for spot lots or lots to arrive, but there are none on the market at present. Sales in the interior are reported at from \$22.50 to \$24, delivered to mills, price according to location.

Scrap Iron.—A very active demand is reported, and prices are firm, with an advancing tendency. Quotations about as follows: \$18.50 @ \$19.50 for cargo lots; \$20 @ \$21 for carload lots, delivered, or for choice \$21.50 @ \$22; No. 2 do., \$14 @ \$15; Turnings, \$13 @ \$14; Old Steel Rails, \$19 @ \$20; Cast Scrap, \$14 @ \$15; do. Borings, \$9 @ \$10; Old Fish Plates, \$24 @ \$25. Old Car-Wheels, \$17 @ \$18, Philadelphia, or its equivalent.

Wrought-Iron Pipe.—There is a continued good demand for Pipe of all sizes. Prices remain firm but unchanged, although there is some talk of a slight advance. Discounts are quoted as follows: Black Butt-Welded, 55 ¢; on Galvanized do., 45 ¢; on Black Lap-Welded, 65 ¢; on Galvanized do., 52½ ¢; on Boiler Tubes, 60 ¢.

Nails.—There is no change to note in the general situation. Prices show no improvement whatever. Standard brands are held at \$1.90 for carload lots, while those of uncertain quality are difficult to market within 10¢ of that figure. There seems to be a lack of confidence, and to do business manufacturers are compelled to quote figures that leave little or no profit in the transaction. Lots from store are quoted at \$2 per keg.

Chicago.

Office of *The Iron Age*, 95 and 97 Washington St.,
CHICAGO, August 27, 1888.

The feature of the past week has been the advance in Old Iron Rails. They had shown an upward tendency for four weeks, but last week they suddenly jumped from \$21 to \$24, with more sales reported than usual. Other material is firmer in sympathy.

Pig Iron.—Some of the largest sellers of Lake Superior Charcoal are now out of the market, having taken all the orders they cared to book for future delivery at current prices. The others are endeavoring to get an advance from belated buyers, very few of them being willing to take orders at our inside quotations. The demand for Strong Coke Foundry is improving, and outside figures are being more easily obtained as buyers increase and sellers decrease. Mill grades are now relatively dearer than Foundry, both in Northern and Southern Iron, doubtless in sympathy with the advance in Old Rails, which will cause some consumers to use Mill Pig more largely. Prices of Southern Irons are almost up to prohibiting figures, Mill grades having already passed that point. The demand for Iron is now on a very fair basis, consignments being easily placed among the local foundries. We quote for cash as follows: Lake Superior Charcoal, all numbers, \$19.50 @ \$20; Alabama Car-Wheel, \$26.25; Southern Charcoal Foundry, No. 2, \$18 @ \$19; Jackson County Softeners, No. 1, \$18 @ \$18.50; Hocking Valley, Soft Foundry, No. 1, \$17 @ \$18; American Scotch (Blackband) No. 1, \$18.50 @ \$19.50; other Ohio Scotch Irons, No. 1, \$17.50 @ \$18; Lake Superior Coke, No. 1, \$17 @ \$18; No. 2, \$16 @ \$17; No. 3, \$15 @ \$16; Southern Coke, No. 2, \$17.25 @ \$17.50; No. 2½ and Open Bright, \$16.50; No. 3, \$15 @ \$16.25.

Bar Iron.—The heavy orders of the season have been generally placed by this time, and apart from the regular buyers the car trade is now looked to for an occasional lift. It is expected that car orders will improve very shortly, as the freight business of the railroads is increasing. The receipt of heavy orders and the

advance in raw material are making the manufacturers very stiff in their views, while many of them have really advanced their rates. New business cannot easily be placed below 1.70¢ f.o.b., Chicago half extras, for carload lots of common Iron. Jobbers quote 1.80¢ @ 2¢ from store, according to quantity and quality.

Structural Iron.—Although bridge-work has been less active in the past week, the demand for Beams for buildings has been excellent. This business has largely originated outside of Chicago, the local building trades being somewhat quiet. Angles are quoted from store at 2.40¢ @ 2.50¢; Tees, 2.60¢ @ 2.70¢; Beams and Channels, 3.80¢. From mill the following quotations are made on carloads: Angles, 2.20¢; Universal Plates, 2.30¢; Tees, 2.45¢; Beams, 3.40¢.

Plates, Tubes, &c.—The Plate mills are very full of orders, some of them declining to quote on new business. Local dealers report no large orders in the market recently, but a very healthy store trade. Prices are very firm. Tubes continue to be sold at the old price in small lots, but the recent advance by the mills has been maintained. Store prices are as follows: Heavy Sheets, Nos. 10 to 14, 2.65¢; Tank Iron, 2.55¢; Tank Steel, 2.80¢; Shell Iron, 3¢; Shell Steel, 3.25¢; Flange Iron and Steel, 4¢; Fire-Box Steel, 4.75¢ @ 5.75¢; Boiler Rivets, 4¢ @ 4.25¢; Ulster Iron, 3.75¢; Boiler Tubes, 60 % and 10 % off on 2½-inch and larger and 62½ % off on 2-inch and smaller.

Sheet Iron.—The excitement among the heavy buyers has not subsided, as all of them appear to have found manufacturers able to supply them. Sales of carload lots from mill are therefore much less numerous. For immediate or reasonably early delivery prices are still held at 3¢ @ 3.05¢, f.o.b. Chicago, for No. 27, but those who are willing to wait until late in November and December can shade these prices slightly. Small lots are sold from store by jobbers at 3¢ for No. 24, 3.10¢ for Nos. 25 and 26, and 3.20¢ for No. 27, with a concession to best buyers.

Galvanized Iron.—A good condition of trade is reported by manufacturers' agents, whose warehouses are kept stocked with assorted gauges and sizes with some difficulty. Prices are fairly maintained, but small lots of Juniata are now to be had at 60 % and 10 % off, and Charcoal at 60 %, 10 % and 5 % off.

Merchant Steel.—The large contracts for cheap Steels are now out of the way, but manufacturers requiring higher grades for their use will soon be in the market. The Plow manufacturers are buying quite liberally at the syndicate price. On the usual grades of Merchant Steel the lines are now being drawn very closely to prevent cutting. It is no longer possible for combination orders to be made up partly of such Steel and partly of other and cheaper goods, so as to make a virtual cut on the Steel. Quotations from store are as follows: Bessemer Bars, 2.30¢ @ 2.40¢; Tool Steel, 8½¢ @ 9½¢; Specials, 13¢ @ 25¢; Crucible Spring, 4.40¢; Open-Hearth Spring, 2.90¢; Open-Hearth Machinery, 2.75¢ @ 3¢; Crucible Sheet Steel, 7¢ @ 10¢.

Steel Rails.—Some of the local companies have been able to take enough orders to fill their allotment and will give way to their less fortunate competitors. While business in this line is quite dull at present, the prospects are brightening for next year. Quite a number of railroad officials are regretting their failure to make extensive renewals this summer while rails were cheap. They see the hardening of prices in other Iron and Steel products and look for sympathetic advance in Steel Rails. The manufacturers

of Rails will probably be chary about taking contracts for next year's delivery at current rates. Quotations continue at \$31 @ \$31.50 for small lots, but desirable orders can be placed at lower rates for fall delivery.

Old Rails and Wheels.—Old Iron Rails experienced a decided advance last week, with a heavy demand and a short supply to meet it. Sales were made at \$21, \$22, \$22.25, \$22.50, \$23 and \$23.75. At the close of the week some holders were asking \$24 and even \$25, but buyers seemed disinclined to follow the upward movement further. Some brokers cabled to Europe for prices, and were quoted rates equivalent to \$23, f.o.b. Chicago, but for immediate acceptance only. The condition of the market is very uncertain at this writing, some of those directly interested predicting still higher prices, while others are confident that prices will recede to about \$21 or \$22, and remain there for some time. Old Car-Wheels are rather scarce, but some movement in them is reported, sales having been made at \$18.50 @ \$19.

Scrap.—An improvement is noted in the demand for Forge, but dealers are not disposed to sell much of their stock at present prices, believing that an advance is impending. Mill Iron has been freely called for. Cast is still quiet. Some demand has been experienced for Borings and Turnings, but Steel has been dull. Dealers offer \$13 @ \$14 for Mixed Country Scrap. Selling quotations for carefully selected are as follows, per ton of 2000 lb: No. 1 Forge or Railroad Shop, \$19 @ \$18.50; Track, \$17.50 @ \$18; No. 1 Mill, \$14.50 @ \$15; Light Wrought, \$10; Horseshoes, \$18.50; Axles, \$23.50; Cast Machinery, \$13.50 @ \$14; Stove Plate, \$11; Cast Borings, \$9; Wrought Turnings, \$11; Axle Turnings, \$13; Coil Steel, \$15; Leaf Steel, \$16; Locomotive Tires, \$16.50.

Hardware.—Prices of Heavy Hardware manifest a stiffening tendency, while the demand is also improving. Builders' Hardware, Nuts, Bolts, Washers and other classes of goods are also more active. In Shelf Hardware the improved feeling is of broader scope, taking in houses which had not previously felt the impulse of heavier buying by the retail trade. Surveying the entire field, the demand now seems to be of a general nature, taking in the whole range of staple and seasonable goods.

Nails.—Manufacturers' agents report a smaller demand for Cut Nails, partly because they are asking slightly higher prices and partly because the leading buyers have supplied themselves for the present. The attitude of the principal manufacturers of Cut Nails is shown by the following extract of a letter from a Wheeling company to their selling agents here: "You are aware that Nails have been selling entirely too low for some time past, and that there is now a better feeling in all kinds of Steel and Iron goods with an advance in some kinds. We think there will be an improvement in the price of Cut Nails in a short time, and we are not desirous to enter more orders at present. Make no engagements or contracts without first consulting us by telegraph." Jobbers still quote \$2 for Steel Nails, and \$2.50 for Wire Nails. The quotation for Wire Nails is, however, liable to be suddenly changed, as the manufacturers have notified the jobbers that they have advanced the price of large lots to \$2.55, f.o.b. Chicago.

Barb Wire.—Trade in this line is stagnant. Jobbers quote 3¢ for Painted, and 3.75¢ for Galvanized, in small lots.

Pig Lead.—Transactions have been confined to small lots, for immediate delivery, as the largest buyers covered all

their requirements by heavy purchases during the preceding fortnight. The prevailing price early in the week was 4.30¢, but prices then advanced to 4.50¢, with a possibility of going still higher.

W. S. Kessler & Co., dealers in Manufactured Iron and Steel, 115 Dearborn street, Chicago, have issued a chart showing the cycles in which panics occur, and the years in which good prices may be expected. It is of interest at this time as an upward movement is predicted for three years, beginning in 1888. The cycles are not taken from Benner's Prophecies, but were worked up by an original investigation.

Pittsburgh.

Office of *The Iron Age*, 77 Fourth Ave.,
PITTSBURGH, August 28, 1888.

The general industrial situation is improving; labor in this district is more fully employed just now than it has been at any time this year, and labor complications are much less frequent of late. Occasionally there is a hitch between employers and employees. River navigation has again been resumed, the effect of which will be to improve general business.

Pig Iron.—While the market is strong and prices have further advanced, there was less business reported the past than the preceding week; however, as consumers are pretty well stocked, having bought enough to cover their requirements for from 30 to 90 days to come, it is not strange that there has been a falling off in demand. Furnacemen generally are pretty well sold ahead and there is but little offering. There is an evident disposition in some quarters to boom the market; considerable Iron is held on speculation, and this will be unloaded just as soon as the holders thereof can satisfy themselves that the highest point has been reached. They could sell now at a profit of from \$1 to \$1.50 per ton, but some of them think the market is destined to go still higher, hence they are not yet prepared to unload. Some furnacemen are confident that prices will go still higher but there are others whose judgment is worthy of as much consideration who are not so confident. It is well known that the raw article is much higher relatively than the products, and unless the latter be pushed up the former will have to go back. We quote prices as follows:

Neutral Gray Forge.....	\$14.75 @ \$15.50.	cash
All Ore Mill.....	16.00 @ 16.50.	"
White and Mottled.....	14.00 @ 14.50.	"
No. 1 Foundry.....	17.00 @ 17.50.	"
No. 2 Foundry.....	16.00 @ 16.50.	"
No. 1 Charcoal Foundry.....	23.50 @ 24.00.	"
No. 2 Charcoal Foundry.....	21.50 @ 22.00.	"
Cold Blast Charcoal.....	25.00 @ 26.00.	"
Bessemer Iron.....	17.25 @ 17.50.	"

While some sellers are asking \$18, cash, for Bessemer, there have been no sales reported above \$17.50, cash. No sales of Mill Iron reported above \$15.50, cash, and then only for well-known brands. Foundry Irons continue dull, but an improved demand is looked for later on in the season.

Muck Bar.—There is considerable inquiry and prices have further advanced; we can report sales at \$28 @ \$28.50, cash, showing an advance of from 50¢ to \$1 as compared with the prices of the preceding week.

Manufactured Iron.—There is an increasing demand for nearly all kinds of Merchant Iron, as there always is when the market stiffens up, as is the case at present. The mills are, therefore, pretty well employed, and likely to be until well on toward the close of the year. Prices may be quoted upon a basis of 1.80¢ @ 1.90¢ for Bars, 60 days, 2 % off for cash for first quality Iron.

Nails.—There is no improvement to note in the Nail trade. Our Pittsburgh manufacturers are still holding for cash

rates, and refusing to sell for less, but from the fact that they are getting very few orders it is evident that buyers are able to do better elsewhere. It is reported that makers west of Pittsburgh are selling as low as \$1.80 and even \$1.75. Makers here say that rather than cut under the regular card rates, which afford a very small margin for profit, they will let their factories stand still.

Wrought-Iron Pipe.—This important branch of the Iron business continues in an unsettled and unsatisfactory condition, and there is not much prospect of any substantial improvement soon. While some of the mills are reasonably well employed others are standing idle, and, while prices have stiffened up somewhat in consequence of increased cost of Pipe Iron, they are still irregular and unremunerative. It is difficult to quote prices accurately: Discounts on Black Butt-Welded may be quoted at 55¢ off regular list; on Galvanized do., 47½¢; on Black Lap-Welded, 65¢; on Galvanized do., 52½¢; Boiler Tubes, 65¢ and 5¢ off.

Old Rails.—There is a continued active demand for Old Iron Rails, with light offerings. Since our last report there has been an advance of \$1 @ \$1.50 per ton, and there is no assurance that the highest notch has yet been reached. We can report sales of American Tees at \$23 @ \$23.50. Present prices will almost let foreign Rails come into this market from the seaboard, but it is expected that the latter will also advance. The stock of American is steadily being reduced, and as there are no new ones being made they will soon be a thing of the past.

Billets, &c.—There is a steady demand for Bessemer Steel Billets, and the market may now be quoted steady at \$29, cash, delivered on cars at makers' works, which is an advance of \$1 per ton within the past 60 days. Sales of Rail Crops and Bloom Ends at \$18.50 @ \$18.75. Steel Rails are quoted at \$30, cash, on cars at makers' works.

Merchant Steel.—The demand has improved, as it usually does at this season of the year; prices remain unchanged. Best brands Tool Steel, 8½¢; Crucible Spring Steel, 4½¢; Crucible Machinery, 5¢; Open-hearth, 2½¢.

Railway Track Supplies.—There is a fair demand for Spikes; no change in prices, 2¢, 30 days, delivered; Splice Bars, \$1.80 @ \$1.90; Track Bolts, \$2.85 with Square and \$2.95 with Hexagon Nuts.

Old Material.—There is a good demand for all kinds of Old Material and prices are firmer. No. 1 Wrought Scrap, \$19 @ \$20 per ton; Wrought Turnings, \$13.50 @ \$14; Car Axles, \$23 @ \$24; Cast Boring, \$11.50 @ \$12, gross; Cast Scrap, \$14.50 @ \$15; Old Car-Wheels, \$19 @ \$20.

Detroit.

WILLIAM F. JARVIS & Co., under date of August 27, report as follows: The strength of the Pig Iron market and the marked advances which have taken place on nearly all grades is an established fact at the present time, although no changes of note have occurred within the past week. Some considerable lots of Lake Superior Charcoal Iron have been placed at full figures. Many of the buyers who postpone their buying until September ordinarily, have been brought to purchasing a few weeks earlier this year owing to the condition of affairs and the strength which the market exhibited. The car works both here and elsewhere seem to have taken a number of new contracts, judging by the inquiries which have been made and orders for Iron which have been placed by them. Old Wheels are strong, but quotations must be nominal except

for small lots, holders declining to part with them, considering their investment in them good for better figures in the very near future. We know of some speculative lots which have been sought for of Lake Superior Charcoal Iron, which heretofore has been a forerunner of better times. We hope the speculators will not forecast the future in error at present. The Mahoning and Shenango valleys producers are very firm at from 50¢ to \$1 per ton higher than the lowest prices of this year. Large amounts of Ore are being moved, causing strong lake freights, but no great advance up to the present time. With a firm market, we make quotations as follows:

Lake Superior Charcoal, all numbers	\$20.00 @ \$20.50
Lake Superior Coke, all ore	19.25 @ 19.75
Lake Superior Coke, cinder mixed	18.00 @ 18.50
Standard Ohio Black Band	19.25 @ 19.75
Southern No. 2	17.75 @ 18.25
Southern Gray Forge	15.75 @ 16.25
Southern Silvery	17.00 @ 17.50
Jackson County (Ohio) Silvery	18.50 @ 19.00
Old Wheels	19.25 @ 20.00

Cleveland.

CLEVELAND, August 27, 1888.

Iron Ore.—Sales of Champion and Republic Ore at \$6 have occurred during the week. Inquiries are almost exclusively confined to high-grade Bessemer Ores, and several instances of such demands having been refused are reported. Particularly is this the case with the better grades of Gogebic Ores, nearly all of the most valuable mines having sold their contemplated output. Fearing additional advances in lake freights, a local dealer is reported to have sold 18,000 tons of non-Bessemer Ore at a price equivalent to \$3.75, f.o.b. cars Cleveland, during the past ten days. Escanaba charters are reported to-day at \$1.10, while the Ashland rate has advanced to \$1.35. The lake and all rail shipments of Ore this season slightly exceed 2,425,000 tons, as against 2,675,000 tons shipped up to a corresponding period in 1887.

Pig Iron.—There has been a square advance of \$1 in the price of Mill Iron, \$15 per ton, cash, having been paid during the past week for a round lot at the valley furnaces. Bessemer Irons are also stronger and are held at \$17.25, cash, at the furnace. Standard foundry Irons are so well sold up that offers have been declined. Stocks are gradually decreasing and prices are growing correspondingly firmer. Most of the furnaces have orders enough on hand to keep them engaged for several months, and are indifferent regarding further sales except at an advance of from 50¢ to \$1 per ton.

Scrap Iron.—A sale of old Americans at \$22.25—an advance of nearly \$2 per ton over last week's quotations—is reported. There is a good demand for Old Wheels, but sellers are asking prices, considered by purchasers to be out of the question.

Manufactured Iron.—Bar Iron has sold at the mill during the past seven days at \$1.70, and inquiries are numerous. Sheet iron, all numbers, is firmer, No. 27 bringing \$3 readily.

Louisville.

LOUISVILLE, KY., August 27, 1888.

The market continues quiet, no large orders having been placed, but buyers of small lots are in the market, and the aggregate sales amount to a fair week's business. There has been no advance in prices, but the market is fairly holding its own. Furnaces are a little more disposed to meet the demands of their customers for long deliveries, and most of the Southern foundrymen will book orders to run through the next 12 months. It was ex-

pected that Chicago and St. Louis would force the market a notch higher during the past week, but advices from both of these points state business is quiet, so the expected advance has not been realized.

Southern Coke, No. 1 Foundry	\$16.75 @ \$17.75
" No. 2	15.75 @ 16.25
" No. 2½	15.25 @ 15.75
Hanging Rock Coke, No. 1 Foundry	17.25 @ 17.75
Hanging Rock Charcoal, No. 1 Foundry	21.00 @ 22.25
Southern Charcoal, No. 1 Foundry	18.00 @ 18.50
Silver Gray, different grades	14.25 @ 15.00
Southern Coke, No. 1 Mill, Neutral	14.00 @ 14.50
" No. 2	13.50 @ 14.00
" No. 1 " Cold Short	13.50 @ 14.00
Charcoal, No. 1 Mill	14.25 @ 15.50
White and Mottled, different grades	12.75 @ 13.25
Southern Car-Wheel, standard brands	23.25 @ 25.25
Southern Car-Wheel, other brands	19.25 @ 21.25
Hanging Rock, Cold Blast	19.25 @ 20.25
Hanging Rock, Warm Blast	19.25 @ 20.25

Old Wheels are in active demand, and their scarcity has caused an advance in price of \$1 a ton during the last week. They are now held at \$19.50.

Chattanooga.

Office of *The Iron Age*, Carter and 9th Sts., CHATTANOOGA, August 27, 1888.

Business men cannot fail to observe the improvement in commercial circles arising from the favorable crop returns that continue to come in from all parts of the South. At this writing it is, of course, impossible to gain a definite comparison of the result of the present year with years gone by, but, from the present outlook, the total yields will exceed those of any previous years. The wholesale merchants located on the trade centers are already buying largely of well-assorted stocks in anticipation of large sales to the interior towns, which the present outlook would seem fully to justify.

Pig Iron.—The past week has developed nothing particularly new nor interesting, but the general statement is about the same as it was two to three weeks ago. While there has been no advance beyond prices that prevailed in the early part of the month, yet there is a very firm feeling as to prices. The furnaces are nearly all sold ahead sufficient to make them quite independent whenever an offer is made that is less than the present market figure. The capacity of the stacks and the demand, so far as can be observed, are now very evenly balanced, excepting perhaps with those stacks whose output has obtained a celebrity, who could, without effort, make contracts several months ahead for their entire product at present prices if they were so disposed, but there is much less of this being done now than two or three years ago. The Southern Steamship Association have issued a circular stating that there will be no rate sheet issued for September 1, reaffirming, so far as they are concerned, the rates of August 1, which are on a basis of \$3 to St. Louis and \$2.25 to Louisville and Cincinnati.

Cincinnati.

CINCINNATI, August 27, 1888.

Pig Iron.—The volume of business in the local Pig Iron market during the past week has not been large, but no difficulty has been experienced by producers in disposing of all the Iron offered; in fact, the outlook has been very encouraging to sellers, and the sales made have been very satisfactory. Full prices have been realized, and in not a few instances higher prices have been secured. As a rule, the furnaces are heavily oversold for a month or so at least, and contracts embracing 15,000 tons Foundry Iron have been refused during the past few days. The supply of desirable Mill grades has been light, but apparently less scarce than Foundry Iron at present. In many instances standard

and desired grades not being available and buyers urgent, various other makes have been disposed of. This leveling up process has a tendency to further strengthen the general market. There is some difference of opinion among sellers as to the exact level of the market. This is no manufacture but is of more prominence now than for some time. No. 1 Mill Iron has been sold at \$14.75 @ \$15, 1000 tons selling at the outside rate, shipment cash. No. 2 Mill is nominally quotable at \$14.25 @ \$14.50; No. 1 Southern Coke Foundry Iron has been sold at \$16.25 @ \$16.50, but some holders demand \$16.75, and have sold lower grades in moderate amounts, estimated on this basis. The crops already secured, and those in prospect are larger and better than any harvested in this section for several years. With this fact as a foundation, confidence is growing fast among sanguine business men. The following are the approximate quotations for the local market, cash, f.o.b. Cincinnati:

Hot-Blast Foundry.

Southern Coke, No. 1.....	\$17.00 @	\$18.00
Southern Coke, No. 2.....	16.00 @	17.00
Southern Coke, No. 3.....	15.00 @	15.50
Ohio Soft Stone Coal, No. 1.....	17.00 @	17.50
Ohio Soft Stone Coal, No. 2.....	15.50 @	16.00
Mahoning and Shenango Valley ..	17.00 @	18.00
Hanging Rock Charcoal, No. 1....	20.50 @	22.50
Hanging Rock Charcoal, No. 2....	19.50 @	21.50
Tennessee and Alabama Charcoal,		
No. 1.....	18.00 @	19.00
Tennessee and Alabama Charcoal,		
No. 2.....	17.00 @	18.00

Forge.

Strong Neutral Coke.....	14.25 @	14.50
Mottled Neutral Coke.....	13.00 @	13.50
No. 1 Mill Coke.....	14.75 @	15.00
No. 2 Mill Coke.....	14.25 @	14.50

Car-Wheel and Malleable Irons.

Southern Car-Wheel.....	20.00 @	23.00
Hanging Rock, Cold Blast.....	22.00 @	25.00
Lake Superior Car-Wheel and Mal-		
leable.....	20.50 @	21.50

Manufactured Iron.—There has been a fair volume of business, and a stronger and more confident feeling has prevailed without quotable change in prices. Common Bar Iron, 1.90¢; Charcoal Bar Iron, 2.90¢ @ 3¢; Sheet Iron, Boiled, Nos. 10 to 27, 2.50¢ @ 3.25¢; Sheet Iron, Charcoal, Nos. 15 to 25, 3¼¢ @ 4¼¢ p lb.

Nails.—There has been a fair jobbing demand and a steady market, but supplies are fully ample. Jobbing prices are based upon 12d @ 40d, which sell at \$2 p keg, with 10¢ rebate in carload lots, at mills. Steel Nails sell at \$2 and Steel Wire Nails at \$2.65 @ \$2.75 p keg.

Old Material.—All the Old Rails offered in this vicinity have sold readily, and a further advance obtains. There is an active inquiry at the close. Moderate amounts have sold at \$21.50 @ \$22.50 p ton. Old Wheels, too, have met a better demand, but few have been obtainable, and prices are nominal at \$20 p ton, spot cash.

New York.

Office of *The Iron Age*, 66 and 68 Duane street. (New York, August 29, 1888.)

American Pig.—The market continues moderately active, with reports of sales of round blocks for delivery over a series of months and a fair volume of inquiry. The opinion has become general among buyers that it is safe to make purchases for delivery during the balance of the year, but, on the other hand, very few sellers claim that there is any chance for any notable advance. The movement in the West during the past month has relieved a great deal of the pressure put on Eastern markets by eager sellers from the South, the Mahoning and Shenango Valleys, and as they are reported to be supplied with orders, in some cases up to the end of the year, a steady market is looked forward to here. We quote standard Northern Irons, \$18 @ \$18.50 for No. 1 Foundry; \$16.75 @ \$17.50 for No. 2 Foundry, and \$15.75 @ 16.50

for Gray Forge. Freights on Pig Iron from Southern furnaces to Boston have been advanced to \$4.11, net.

Spiegeleisen and Ferromanganese.—Spiegeleisen has advanced abroad from 71/ to 73/ for German, yet lots afloat and August shipments are being offered at \$25.75 for German 20 % and \$26.75 for English, with seller's option of brands. In Ferromanganese there has been an advance of 5/ abroad, due to scarcity and higher prices of Ore, and importers are asking \$50.50 @ \$51.50 for 80 %.

Steel Rails.—The market continues dull and irregular, only one transaction of 5000 tons for a coal road being reported, and one 1200 ton lot for Florida. In the East very little business is coming up. A good deal of inquiry is in hand for the South, but the great bulk of it is not in such shape that the mills care to touch it. Long time, with bonds as collateral for individual notes of contractors, merchants and promoters are generally the terms offered, the propositions at times bordering on the ludicrous. It is possible that a tide of prosperity may carry such schemes nearer consummation, but for the present they afford little relief to the rail mills. We continue to quote \$28.50 @ \$29 at Eastern mill for standard sections.

Wire Rods.—Importations this year are very much smaller than they have been for a long period, American competition on the one hand and the position of the German syndicate on the other having caused the decline. It is estimated that this year the importations of foreign Fence Rods will not be larger than 75,000 to 80,000 tons. In former years the inland German works had the advantage, because our 45 % duty is assessed on the price of the Rods at works. When two German mills one near the shipping port and the other distant from it quoted the same, f.o.b. price, the latter had the advantage. The German syndicate determined to equalize this and adopted a complicated system. From the circular issued in the spring of the current year, when the standard price was 109 marks, we quote:

The following example will explain the calculation of the respective "net at works" price for the different works belonging to the Verein Deutscher Draht-Walzwerke for arriving at the equivalent values f.o.b. Antwerp, including U. S. duty:

Remarks.

Y means the f.o.b. price for Phoenix (Standard). Z means the respective "net at works" price. n means the f.o.b. freight from works to Antwerp.

4 marks means the f.o.b. freight from Phoenix-Ruhrort to Antwerp.

Starting from this basis, the following formula is arrived at:

$$Z = \frac{y - n + 0.45 \times (y - 4)}{1.45}$$

Taking the present Standard f.o.b. price for Phoenix—viz. 109 marks.....	109.00
Adding U. S. Duty, 45 % on 109 marks less 4 marks freight, or on 105 marks.....	47.25
The f.o.b. Antwerp price, including U. S. duty per 1000 Ko., amounts to.....	156.25

The following examples will illustrate the calculation of "net at works price" for Phoenix and other works belonging to the Verein Deutscher Draht-Walzwerke—i. e., Haspe and Schalke:

Phoenix-Ruhrort.	Marks.
Present Standard price f.o.b. Antwerp.....	109.00
Freight Phoenix to f.o.b. Antwerp.....	4.00
Price net at works.....	105.00
Add actual freight to f.o.b.	4.00
U. S. duty 45 % on 105 marks.....	47.25
Total.....	156.25

Krueger-Haspe.	Marks.
Present Standard price f.o.b. Antwerp.....	109.00
Freight Haspe to f.o.b. Antwerp.....	7.80

$$Z = \frac{109 - 7.80 + 0.45 \times (109 - 4)}{1.45} = 102.38$$

Price net at works.....	102.38
Add actual freight to f.o.b.	7.80
U. S. duty 45 % on 102.38 marks.....	46.07

Total.....	156.25
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Boecker-Schalke.	Marks.
Present Standard price f.o.b. Antwerp.....	109.00
Freight Schalke to f.o.b. Antwerp.....	5.00

$$Z = \frac{109 - 5.00 + 0.45 \times (109 - 4)}{1.45} = 103.99$$

Price net at works.....	103.99
Add actual freight to f.o.b.	5.90
U. S. duty 45 % on 103.99 marks.....	46.86

Total..... 156.25

This wonderful system, devised to equalize the price at Antwerp, duty added, is a source of much annoyance to buyers of German Rods. The standard price is now 103 marks, at Antwerp. During the week the sales of Foreign Rods have been light, prices remaining weak at \$39.50 @ \$40, ex-ship.

Old Rails.—Under liberal inquiries and short supplies the market has advanced, though too rapidly to allow of much business being done. The only sales reported are one lot of 500 tons a shade under \$23 at Buffalo, a lot of 1000 tons at a shade under \$24 at Youngstown, and 500 tons also for Western delivery at about \$22 on the line of a road in this State. During the past few days \$22 has been bid in vain for Tees, and \$23 for Double Heads. Our market is still considerably below the foreign quotations, held stiff by the fact that Genoa is paying 70/, c.i.f., for Old Rails. The majority of the New England mills are holding at \$24 and \$25, and the bulk of the foreign stock controlled here is held at \$24 for Doubles.

Swedish Iron.—The market is quiet with quotations \$53 for Rough Bars \$56 for Rods, and \$60, ex-ships for Store specifications.

Track Material.—Spikes are active and stiff at \$2.10 and Angles firm at 1.90¢.

Metal Market.

Copper.—The shorts in London seem to have deemed it advisable to cover, and the market there as a consequence has once more taken a decisively upward turn. Opening on Thursday of last week at £83. 7/8, spot Chili Bars advanced all the way to £86 yesterday, while futures remained steady at £79 and good merchantable brands rose from £74. 5/ to £76; sales aggregated 1820 tons. Here a similar movement took place on a moderate scale for similar reasons, some 125,000 lb August being sold at 16.95¢ @ 17¢, while the later months also ruled higher; 16.80¢ @ 16.90¢ was the quotation for September, 16.50¢ @ 16.80¢, nominally, for the winter. This morning a fresh advance in spot Chili Bars is cabled from London from £86 to £88. 15/, futures at the same time giving way from £79 to £78. 15/, but good brands improving from £76 to £78. 5/, and Best Selected for the week from £76. 10/ to £79. Copper closes firm to-day at 16.90¢ @ 17¢ spot, 25,000 tons August selling at 16.90¢ on the first call. The following dispatch was received from Boston August 24 and 27: "The Boston and Montana mine produced 536,286 lb of Refined Copper the second week in August, against 371,560 lb the first week, and this is the largest week's output yet made. The net profit is about 5¢ p lb, or fully \$25,000 for this one week's work. The Boston and Montana directors will call a special meeting of stockholders to authorize an issue of 50,000 shares of new stock, 10,000 shares to remain in the treasury and 40,000 shares to be given to stockholders at par—\$25. The net profit of the Kearsarge mine for August is over \$6000, and work only began August 15." Rio Tinto shares gave way 17 francs last week at Paris. As per Messrs. James Lewis Son's Liverpool semi-monthly report of August 16, the import of American Copper into Liverpool and Swansea from January 1 to date had been 17,139 tons, Fine, as compared with 6856 tons during the corresponding period of last year.

Tin.—Both in London and here the market has been tame and featureless dur-

ing the week, with the tendency downward. London opened on last Thursday at £92. 10/ spot, closing yesterday at £92. 2/6, while three months gave way from £93 to £92. 15/, sales altogether not exceeding 810 tons. Here very little transpired either in a jobbing or speculative way, the quotations ranging as follows: Spot, 20½¢ @ 21½¢, and October, 20½¢. The market in London this morning shows no further change. The closing spot figure to-day in this market is nominally 21½¢, at which the market remains apathetic.

Tin Plates.—There is a fair demand springing up for all kinds of Tin Plates, but, so far as Coke Tins are concerned, it cannot be met, owing to an entire absence of stock. In some cases two grades of Charcoal have been substituted. This demand comes almost exclusively from the fruit canners, the oil canners being sufficiently provided with their special size. Futures can be had at a considerable concession on spot rates, which stimulates activity therein all the more. A thing which rarely occurs is to be noted at the present time—viz., that consumption is evidently ahead of production, but this may soon be met by the starting of new works. We quote toward the close, large lines, 3/ box, on the spot: Siemens-Martin Steel, charcoal finish, \$4.85 @ \$5.25; Coke finish, \$4.75; Ternese, \$4.30 @ \$4.40; Bessemer Cokes, \$4.50 @ \$4.60, and Wasters \$4.20 @ \$4.25; Liverpool is 13/6 with Coke Tin.

Lead.—The chief operator has again been actively at work, buying spot and futures right and left, and causing the open market to advance from 4.30¢ on the spot on Wednesday of last week to 4.80¢ last night, some 1400 tons changing hands, and the latter figure being firmly held at the close. While this was the case in the open market, activity was quite as great on 'Change. Consumers meanwhile remained passive lookers on, not buying anything to speak of. Some 1600 tons of Lead were sold on the Metal Exchange, the interest centering on deliveries up to the end of October, at rising prices, carrying the latter from 4.45¢ August to 4.87½¢ September, October to 4.85¢ and November to 4.65¢. In London Soft Spanish has remained steady during the week at £13. 2/6, while English Pig rose from £13. 5/ to £13. 7/6. St. Louis is firm at 4.60¢.

Spelter.—The situation out West has lost nothing of its strength during the week. Here but little has transpired, Common Domestic not being obtainable for less than 5¢. In London Silesian advanced from £17. 5/ to £17. 10/, and has now to be quoted 5.55¢ nominally here.

Antimony.—Hallett has recovered in London from £38 to £39. Here only a moderate jobbing trade has been transacting at 9½¢ Hallett and 13½¢ Cookson.

New York Metal Exchange.

The following sales are reported:

THURSDAY, August 23.	
116 tons Lead, August.....	4.40¢
32 tons Lead, August.....	4.45¢
FRIDAY, August 24.	
25,000 lb Copper, January.....	16.50¢
100 tons Lead, August.....	4.64¢
SATURDAY, August 25.	
30 tons Tin, August.....	21.00¢
MONDAY, August 26.	
100 tons Lead, September.....	4.65¢
100 tons Lead, spot.....	4.70¢
48 tons Lead, September.....	4.72½¢
48 tons Lead, September.....	4.70¢
25,000 lb Balto. Copper, August.....	15.45
100 tons Lead, August.....	4.75¢
100 tons Lead, September.....	4.75¢
18 tons Lead, September.....	4.80¢
32 tons Lead, September.....	4.77½¢
32 tons Lead, October.....	4.77½¢
96 tons Lead, November.....	4.66¢
TUESDAY, August 28.	
50 tons Lead, October.....	4.80¢
25,000 lb Copper, August.....	16.95¢
100,000 lb Copper, August.....	17.00¢
100 tons Lead, October.....	4.80¢
10 tons Tin, October.....	20.50¢

116 tons Lead, October.....	4.80¢
100 tons Lead, October.....	4.65¢
50 tons Lead, October.....	4.80¢
100 tons Lead, September.....	4.80¢

Financial.

The sensations of the week were extraordinary speculative transactions in wheat, which on a single day made an aggregate of nearly 35,000,000 bushels, and President Cleveland's message relating to trade with Canada and calling for an enforcement of the Retaliation act of March, 1887. The latter, although of deep interest to politicians, was not seriously regarded in business circles. Encouraged by the excellent outlook for crops, good progress has been made in opening the fall trade, and it is observed that despite the conservatism ruling in all departments—as shown by cautious buying—the general trade of the country in July and August compares well in volume with that of former years. Among dry goods jobbers in New York the market has been full of buyers from all sections of the country, with the result of increased shipments and a hardening tendency in prices. Sales are believed to differ little in amount from those of last year for a corresponding date. Wheat advanced 5½¢, but has fluctuated on conflicting reports. Corn and oats also advanced a fraction, despite favorable accounts from the West. Cotton has been lower, but spots advanced ½¢ on Monday. Coffee, sugar, and other leading staples, are firm.

The Stock Exchange markets were dull and irregular until Monday, when they became active and higher, influenced principally by higher prices in London. The most active were Reading, St. Paul, Lackawanna and Western Union. Lackawanna scored the best figures for two years. All the leaders were strengthened by the advance in the prices of Coal announced on Friday. The only perceptible effect of the President's message was a decline of about 1 % in Canada Southern and Michigan Central. In London the cables showed that there was some uneasiness, but, after an interval, selling orders were withdrawn. United States bonds are quoted as follows:

U. S. 4½s, 1891, registered.....	106½¢
U. S. 4½s, 1891, coupon.....	107½¢
U. S. 4s, 1907, registered.....	123½¢
U. S. 4s, 1907, coupon.....	123½¢
U. S. currency 6s.....	120

The Washington crop bulletin for the past week states that the weather has been especially favorable for harvesting in the Northwest. The wheat harvest progressed rapidly in the central and northern portions of Dakota and Minnesota, from which region the reports indicate that the damage to the wheat crop from the frosts of last week was largely overestimated. In the northern portion of the corn belt the weather was favorable, but the growth of the plant was retarded by the low temperature. The St. Paul *Pioneer Press* summarizes the crop situation by saying that the wheat yield in Minnesota and Dakota will be fully as large as was expected. Reports from nearly all parts are favorable to a large yield of oats. The Cincinnati *Price Current* says that "outside of some districts in Southern and Western Kansas there is continuance of an almost uniformly good promise for corn. The latest sales comprise 96,000 bushels at \$1.03½ for Manitoba spring; \$1.07 @ \$1.08 for No. 1, hard, afloat, spot and to arrive, and \$1 for No. 2 red, in elevator. Cash corn is quoted 53½¢ for No. 2 mixed, afloat, and 58¢ for No. 2 white, delivered in September. Provisions are stronger.

The cotton crop of Texas is now estimated at 1,500,000 bales, and with favorable weather may extend to 1,900,000 bales. Last year it amounted to 1,400,000 bales.

The weekly statement of the associated banks showed a further decrease in sur-

plus reserve, equal to \$732,825, reducing the excess to \$21,003,425, but this item is still maintained far above the records of the last two years. The banks were somewhat depleted of funds by the demand from the interior, but much below expectations, which is attributed partly to dullness in the pork-packing trade, but bankers look for a more urgent demand for money at an early day. In loans there was a further expansion of \$839,900. Deposits decreased \$3,499,900, and circulation increased \$55,800. Rates for money are practically unchanged. Commercial paper is fairly active. In the West the demand for funds is variable, according to locality.

Harvey Fisk & Sons, heavy dealers in Government Bonds, have issued a circular, calling attention to the "great peril" arising from the Treasury surplus. Since the Secretary of the Treasury commenced to purchase with surplus money in April last, he has, by official statements from the Department at Washington, purchased, up to August 21, \$38,601,150 4s and 4½s, on which he has made a saving to the people in future interest payments of upward of \$12,000,000. The circular argues that the existing surplus should be expended in the same way, thereby effecting a saving of \$40,000,000 more in future interest payments, and he expresses the opinion that the bonds could be bought at prices which would effect this saving.

The Gansevoort Bank was organized with \$200,000 capital and will locate near the new market. The president is Timothy C. Kimball, and Charles E. Bigelow, of the Blake & Knowles Steam Pump Company, is vice-president. A bank for the hat and clothing trade is being organized with a capital of \$250,000, and Jos. W. Conron, of the firm of E. V. Connett & Co., is spoken of for the presidency.

Sterling exchange is inactive and barely steady. The London *Economist* speaks of the continued demand for gold for South America and the large stocks of metal held by the banks of France and Germany, but as the latter will hardly care to part with much gold the Bank of England will be compelled to advance its rate again if withdrawals are made.

As the month of July began the new fiscal year the course of our foreign trade, as shown by the statistics from Washington in a comparison with former seasons, is watched with eager interest. The statement now at hand shows that the exports for the month, including the large shipments of specie, have not fallen much below the corresponding figures of last year, which was not a promising season, but the imports have gained \$2,500,000, thus increasing the balance of trade against this country. Taking the merchandise alone, excluding the precious metals, we find that the exports were only \$45,267,938, against \$49,395,912 for July of last year, and the imports were \$61,329,461, against \$56,593,226, leaving a balance of trade against this country, exclusive of specie, of \$16,061,523 for the last month, against only \$7,197,314 for July of the preceding year. In July of last year we gained over \$2,000,000 in specie; but in July of this year we lost \$3,500,000 in gold and silver. For the seven months in 1888 we have an excess of imports amounting to \$55,500,000, while for the first seven months of 1886 we had \$37,500,000 excess of exports, making a change in the comparative balance of trade of \$93,000,000.

Coal Market.

The Anthracite Coal trade continues active at firm prices, and the volume of trade is almost without precedent, but the producers seem to have slackened a little dur-

ing the past week, the total output having dropped to 832,058 tons, a decrease of 89,000 tons compared with the previous week, but still far above the usual average. Compared with the corresponding week last year there is an increase of 104,000 tons. Since January 1 the aggregate is 23,092,621 tons, an increase of about 1,000,000 tons compared with the same time in 1887. For four weeks the comparison is as follows:

	Tons.
Week ended August 4.....	754,883
Week ended August 11.....	831,615
Week ended August 18.....	920,922
Week ended August 25.....	852,058

In accordance with the action taken by the sales agents last Friday, as foreshadowed in these columns a week ago, the September price for Free-burning Anthracite at the mines will be as follows: Broken and Egg, \$2.65; Stove and Small Stove, \$2.90, and Chestnut, \$2.65 @ \$2.75. Pea Coal was left unchanged at \$1.25, and Furnace Lump at \$2.25. These new prices are 10¢ per ton higher for Broken and 15¢ for Egg, Stove, Small Stove and Chestnut sizes than the figures which have been ruling for several months past. Including tolls, this is equivalent to about 25¢ advance per ton all round.

September prices are as follows:

Hard, Broken.....	\$4.20
" Egg.....	4.40
" Stove.....	4.65
" Chestnut.....	4.55
Free-Burning, Broken.....	3.95
" Egg.....	4.30
" Stove.....	4.65
" Chestnut.....	4.55

Pea has sold as low as \$2; ruling price, \$2.25 @ \$2.35.

The several companies are said to have no lack of orders, but complaint is general of delay in shipments.

The Bituminous trade steadily increases in volume and prices are reported pretty firm on the better grades. The pool prices remain \$3.25 f.o.b.

The Reading output for the work ending August 25, was 205,000 ton, of which 12,000 were sent to Elizabethport. The Pennsylvania carried for the week ending August 18 219,680 tons of coal, and the increase since January 1 is 807,000 tons compared with last year.

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]
LONDON, WEDNESDAY, August 29, 1888.

Events in the Copper market the past week strongly suggest that the syndicate has virtually succeeded in gaining complete control. English smelters who, apparently, have been left to shift for themselves experience an increased demand for their product, and Best Selected has advanced about £2 in consequence. The recently introduced G.M.B. contracts seem to be as closely controlled as are Chili Bars, and the "outside" supplies, by all accounts, are virtually exhausted. This condition of affairs naturally forces buyers to go to headquarters for supplies, and Chili Bars have been more eagerly bought there by consumers this week than at any previous time. The masters of the situation have shown the former derelicts no special consideration. To the contrary, these buyers have been allowed to run the price up on each other. Meanwhile the screws tightened almost automatically upon "short" sellers' contracts on which deliveries are due this month and next. The result of the conditions noted is reflected

in an advance to £88 for Chili Bar prompts; £83 for Chili Bar futures, and £76 for G.M.B. contracts.

The price of Pig Tin has gradually softened, although still receiving a certain degree of support from the "bull" interest. It is stated that the shipments from the Straits will be heavy during the next 30 days, and also that colonial holders have shown some evidence of inclination to realize on at least a portion of their stocks. Still it is apparent that efforts are not spared to hold prices up while the endeavor is made to accomplish their purpose, and the "bear" interest have therefore gained but slight advantage. Outside speculation in the metal has been small during the week, and the alleged support from the American market reported a short time ago seems to be missing at the present time.

The position of the Tin-Plate market is still very strong. There continues to be a brisk demand for both near and distant future deliveries. Makers are so far sold that only a moderate amount of the demand for early shipments can be accommodated, and in most cases they are reluctant to enter orders for more distant deliveries at present prices. Steels are still in relatively the greatest demand. Shipments are running very heavy. A new Black Plate mill is soon to be started at Pontypool.

The Scotch Pig market shows a continued hardening tendency, and on the Middlesboro' product and Hematites the same is to be remarked. Speculation has figured less conspicuously than heretofore in shaping the course of the market. Increased demand from consumers is now the main basis of strength. In the Scotch trade American demand is also figuring somewhat prominently as an influence. Makers' brands have advanced 6d. @ 1/; Middlesboro' is 9d. and Bessemer Pig 6d. higher.

The Steel trade, with some few exceptions, is brisk and large orders are reported placed in some branches. The Scotch makers are said to be specially active and one firm is reported to have booked an order for 1000 tons Boiler Plate. Rails, Blooms and Rods are exceptional, and the prices on these are barely maintained.

The Manufactured Iron branch also continues brisk, with noticeable activity among the makers of Plates. Staffordshire Common Bars have been sold at 5/ advance and Black Sheets at 2/6 advance.

Old Iron Rails are firmer and in more active demand, with considerable inquiry from America reported.

Scotch Pig.—The market has continued active and prices are higher:

No. 1 Coltness, f.o.b. Glasgow.....	49/
No. 1 Summerlee, " ".....	49/6
No. 1 Gartsherrie, " ".....	46/8
No. 1 Langloan, " ".....	46/8
No. 1 Cambro, " ".....	42/6
No. 1 Shotts, " at Leith.....	46/6
No. 1 Glengarnock, " Ardrossan.....	44/9
No. 1 Dalmellington, " ".....	41/
No. 1 Eglinton, " ".....	41/

Steamer freights, Glasgow to New York, 6/; Liverpool to New York, 7/6.

Cleveland Pig.—There has been a further advance with active trading; No. 1 Middlesboro', G.M.B., 36/6; No. 3 do., 34/.

Bessemer Pig.—The market firm at 6d. advance and fairly active. West Coast brands, mixed numbers, 44/6, f.o.b. shipping point.

Spiegeleisen.—Good business passing at steady prices. English 20 % quoted 80/, f.o.b. N. W. England shipping point.

Steel Rails.—Demand has been rather slow. Standard sections quoted at £3. 17/6, f.o.b. at N. W. England shipping point.

Steel Blooms.—No change in the market for these. We quote at £3. 12/6 for 7 x 7, f.o.b. at N. W. England shipping point.

Steel Billets.—Business very fair at steady prices. Bessemer, 2½ x 2½ inch, £3. 17/6, f.o.b. at N. W. England shipping point.

Steel Slabs.—Very little doing, and prices rather weaker. Bessemer, £3. 15/, f.o.b. at N. W. England shipping point.

Steel Wire Rods.—The market is without change. Mild Steel No. 6 quoted at £5. 16/ and No. 5 at £5. 14/, f.o.b. at N. W. England shipping point.

Old Rails.—Demand fairly active and prices firm. Tees quoted at £2. 15/, and Double Heads £2. 17/6, free on board.

Scrap Iron.—Trade moderate at about former rates. Heavy Wrought quoted at £2. 5/, f.o.b.

Crop Ends.—Business slow and at unchanged prices. Bessemer quoted £2. 5/ @ £2. 7/6, f.o.b.

Tin Plate.—The market remains very firm. We quote, f.o.b. Liverpool:

IC Charcoal, Allaway grade.....	15/ @ 15/6
IC Bessemer steel, Coke finish.....	13/3 @ 13/6
IC Siemens " ".....	13/6 @ 13/9
IC Coke, B. V. grade.....	13/ @ 13/6
Charcoal Terne, Dean grade.....	13/ @ 13/3

Manufactured Iron.—The market continues strong and active. We quote, f.o.b. Liverpool:

	£ s. d.	£ s. d.
Staff. Ord. Marked Bars.....	@ 7 10 0	
" Common ".....	@ 5 0 0	
" Bl'k Sheet, singles.....	@ 6 17 6	
*Velsh Bars (f.o.b. Wales)....	4 12 6 @ 4 15 0	

Tin.—Steady, with a fair business. Straits quoted at £92 @ £92. 5/, spot, and £92. 10/ @ £92. 15/ for three months' futures.

Copper.—Market strong and active. Chili Bars, £88 @ £88. 5/, spot, and £83 @ £83. 10/ three months' futures. Best Selected, £78. 10/ @ £78. 15/.

Lead.—Steady market; demand fair. Soft Spanish, £13. 2/6.

Spelter.—Market continues very strong. Silesian, ordinary, £17. 7/6 @ £17. 12/6.

Hardware, Machinery, &c.

Barbour Bros. & Co., Mach'y, pkgs., 11	
Beniger Bros., Hdw., pkgs., 45	
Boker, Carl F., Mds., cs., 2	
Boker, Hermann & Co., Mds., cs., 22; Arms, cs., 42	
Brown, T. J., Tram Cars, Wheels, Axles, &c., cs., 30	
Cheesborough & Co., Tin Tubes, bales, 2	
Dolge, Alfred, Mds., cs., 7	
Fild, Alfred & Co., Arms, cs., 16; Caps and Wads, cs., 32	
Folsom, H. & D., Arms, cs., 2	
Graef Cutlery Company, Cutlery, cs., 9	
Hawland, S., Brassware, csc., 1	
Lau, J. H. & Co., Arms, cs., 17	
Merchants' Despatch Company, Mds., pkgs., 74; Arms, cs., 22	
Reux, C., Hdw., csc., 1	
Schoverling, A., Arms, cs., 45	
Shoverling, Daly & Gales, Arms, cs., 49	
Ward, Jas. E. & Co., Mach'y, bxs., 3; do., pkgs., 386	
Wiebusch & Hilger, Lim., Arms, cs., 7; Cutlery, cs., 6	
Witte, John G. & Bro., cs., 8	
Order: Brick Presses, pkgs., 9	

The steamer Umbria made her last trip out in 6 days, 6 hours and 14 minutes to Brow Head, easily beating the new Inman liner City of New York.

Hardware.

The trade for the month is winding up in a quiet manner and without any feature of particular interest. It is not probable that the business for the month will aggregate very large or turn out as well as was expected at the beginning, but we hear no great complaints, and a good fall trade seems to be generally expected. Manufacturers are running full and apparently making up stocks with confidence, but are cautious about placing orders for materials to cover any very long period.

Barb Wire.

A little more business is doing in the New York market, occasional orders for carload lots being taken, which we quote 3.9 to 4 cents for Galvanized. The crop outlook is giving encouragement to manufacturers, and the belief is expressed that should the good prospects now before the farmers be realized a growing demand would soon end the demoralized condition of the Barb Wire trade in the West.

Cut Nails.

The New York market is moderately active, with prices a shade firmer. There is but little cutting of the new schedule of extras. We quote \$1.85 @ \$1.90 for carload lots on dock, and \$1.90 @ \$1.95 for small lots from store.

Wire Nails.

At the meeting of the Western Wire Nail Association, held at Cleveland last week, prices on Standard Wire Nails were advanced to \$2.65, less 10 cents per keg, in lots of 240 kegs. For miscellaneous Nails the discount on less than 1 ton lots is 70 and 10, and for larger quantities 70, 10 and 5, for Cincinnati, Chicago and East St. Louis delivery, the terms being acceptance 60 days or 10 per cent. off, ten days. Since then the market has stiffened here, the majority of sellers asking \$2.55 for carload lots and \$2.65 for store lots, at New York. Another meeting of the Wire Nail manufacturers is to be held at Pittsburgh to-morrow to discuss plans submitted.

During the session of the Fork and Hoe makers, at Rochester, the manufacturers of Scythe Snaths also held a meeting and perfected an organization with a view to controlling the prices of their goods. The result of the meeting was that a discount of 50 per cent. was adopted as the price to the general trade, with extra discounts for quantities. The terms are 60 days from March 1, or 2 per cent. discount for cash in 10 days. Deliveries are the same as those governing the distribution of Forks and Hoes. In other words, it is an equalization of freights between the different makers.

An expectation seems to exist in some quarters that an advance in Shot is likely to take place on account of the increasing price of Lead, which has advanced considerably since the recent change in the price of Shot.

A. W. Paine, Peabody, Mass., will in future make four sizes of the Peabody Door Springs, of which the trade prices are as follows, with discounts for large lots:

No. 1, for screen doors.....	\$1.25
No. 2, for house doors and heavy screen doors.....	1.25
No. 3, for store doors.....	1.50
No. 4, for heavy store doors.....	2.00

The Covert Mfg. Company have issued the following revised discount sheet:

	Dis. per cent.
Loop Harness Snaps.....	50
Round Eye Snaps.....	60&10
No. 88 Round Eye Snaps.....	50&10
"New" Loop Harness Snaps.....	50&5
"New" R. E. Harness Snaps.....	60

Martingale Loop Snaps.....	50
Snap and Thimble.....	60
"New" Snap and Thimble.....	60&10
Thimbles.....	60&10
Round Eye Swivel Snaps.....	60
Loop Swivel Snaps.....	60
Heavy 1 in. Swivel Snaps.....	60
"Giant" Open Eye Snaps.....	35
Open Eye Snaps.....	50&10
"New" Open Eye Snaps.....	50
Double Snaps.....	50
Combined Bit and Snaps.....	35
Leather Horse Tie.....	35
Strap Eyes.....	50
Horse Ties, Snap and Thimble (Jute).....	60&10
Horse Ties, Snap and Thimble (Hemp).....	50
Cattle Ties, Snap and Thimble (Jute).....	60&10
Cattle Ties, Snap and Thimble (Hemp).....	50
Horse Tie, "New" Snap and Thimble (Jute).....	60&20
Cattle Tie, "New" Snap and Thimble (Jute).....	60&20
Lariat Tether.....	50&10
Picket Pins.....	60
Horse Tie, O. K., (Jute).....	60&20
Cattle Tie, O. K., (Jute).....	60&20
Web Horse Tie.....	50
Rope Halter, 1/2 inch, (Jute).....	50
Rope Halter, 1/2 inch, (Hemp).....	50
Rope Halter, 7-16 inch, (Jute).....	60&10
Adjustable Rope Halters.....	40
Halter Leads (Hemp).....	50
Halter Leads (Jute).....	60
Halter Leads (Jute) "New" Snap.....	60&10
Halter Leads, 3/8 inch.....	60
Gentlemen's Hitching Cord.....	25
Weight Cord.....	35
Hitching Weight.....	50
Driving Reins.....	40
Hammock Ropes.....	60&20
Flexible Curry Comb and Sweat Scraper.....	35
Balling Iron.....	35
Adjustable Web Halter.....	35
Web Halter.....	35
Bull Leads.....	35
Bull Snap.....	35
Soldering Irons.....	35
Soldering Coppers.....	30
Bristle Card.....	35
Hitching Post.....	35
Rod Post Hitcher.....	60&20
Stallion Chain.....	35
Cart Breech End Irons.....	25
Cart Breeching Chains.....	25
Halter Chain.....	60
Rein Chain.....	60&20
Breast Chain, Short Snaps.....	50
Lengthening Snaps.....	35
Open Eye Breast Chain Snap.....	35
Breast Chain, Long Snap.....	50
Post Chain.....	60&20
Breast Chain, New Patent.....	50
Center Breast Chain Snap.....	35
Wheelbarrow Wheels.....	25

Our Louisville correspondent writes us as follows:

The jobbers in the Hardware trade make varying reports the past week. The extraordinarily heavy rains have had some bad effects on trade, especially down in the Cotton belt. The salesmen traveling in that part of the country say the merchants who have been often hurt by a little overbuying in bad crop years were afraid the cotton would be injured, making them quite wary for the present. Consequently those dealers who strive for this business particularly find it dull. Others report the heavy demand of last week to continue, and in some lines to increase. Bar Iron has been very quiet, little is offering from the mills and limited amounts are going into consumption. Heavy miners' and contractors' supplies continue in good demand. One house handling largely of these goods makes a point of carrying in stock every article enumerated in their catalogue, which fact brings its own reward. Those jobbers making a specialty of Wagon and Carriage goods say that trade was never better—in fact it is quite large enough to handle satisfactorily. The Hub and Spoke factories are all running full.

We are informed that Mr. E. Bertram Pike, who has represented the A. F. Pike Manufacturing Company on the road for the past two years, has associated himself with Mr. C. O. Danforth, of Boston, under the style of Danforth & Pike, manufacturers' agents. Mr. Pike will start upon his fall trip about September 1, still representing the A. F. Pike Manufacturing Company and several other well-known Hardware manufacturers.

Hartley & Graham, 17 and 19 Maiden Lane, New York, having purchased the entire stock of Colt's New Line 30-caliber and Colt's Old Model 22-caliber Revolvers, offer them at a very large reduction in price. They are all regular standard goods.

We have before us Sargent & Co.'s new catalogue, which is a handsome volume of 1100 pages, bound in cloth sides, red leather back, and of convenient size for handy use. About three-fourths of the book are devoted to their own manufac-

tures, everything up to page 858 being made at their New Haven factories. The remaining pages are taken up with miscellaneous Hardware and Tools, the goods shown being all regularly kept in stock. The first 240 pages are devoted to their line of Locks, of which about 50 pages are given up to new goods, among which a greatly increased line of Bronze Metal Door Knobs is particularly noticeable. A frontispiece gives a view showing the present extent of the works, including the new Lock factory, which is the latest addition, and will enable those who can compare this with the view of the works previously published to appreciate the additions which have been made to this establishment. The catalogues issued by Sargent & Co. are noted for the clear, compact and convenient manner in which they are arranged, and the volume before us is another conspicuous example of the same qualities, which are carried still further than in its predecessors. The arrangement of cuts and type is made with a careful view to the convenience of the trade in using the book, as well as with an eye to artistic effect, and with such success that we do not know of any book which excels it either in beauty or convenience. The mechanical part of the work is thoroughly well done, and it is printed on paper which makes a very good appearance, while it is thin enough to keep the thickness of the volume within reasonable bounds. This book is now ready for delivery, and will be sent to customers with the first lot of goods ordered, or, if desired, expressed to their address.

C. M. McClung & Co., Knoxville, Tenn., have added to their stock of Hardware and Cutlery a line of Stoves, Ranges, Grates, &c., of which they issue a handsome pamphlet.

The new catalogue of Tower & Lyon, 95 Chambers street, New York, is about double the size of their previous one. It is handsomely printed and very neatly bound in flexible cloth, with red edges. We notice that they have added to their assortment of Iron and Wood Bottom Planes until they now make some 75 numbers. They have increased their line of Tools, illustrating their Excelsior Expansion Bit and Wood's Extension Level, also the Stephen's Vise, of which they obtained control last year. They have dropped some items given in a former catalogue and are becoming more and more manufacturers of high-grade Tools. They illustrate a very full line of Police Equipments, with which Mr. Tower has been so long identified.

Under date of 25th inst. C. Sidney Shepard & Co., 23 and 25 Randolph street, Chicago, Ill., issue a fall circular which is principally devoted to seasonable goods.

The St. Louis Vise and Artesian Well Tool Company, St. Louis, Mo., manufacturers of Well-Drilling Machinery and Tools, issue their catalogue C. This company supply everything necessary for boring wells to any depth, and will furnish experienced operators, if required, to go to any part of the country. They have enlarged their facilities for turning out work and are now prepared to execute orders with dispatch.

Hibbard, Spencer, Bartlett & Co., Chicago, Ill., have issued price list No. 100, which is devoted to Firearms, Ammunition, &c.

Price List No. 123 has just been issued by the James L. Haven Company, Cincinnati, Ohio, giving revised prices of their goods up to date.

The Hartman Mfg. Company, Beaver Falls, Pa., have issued their first catalogue, giving illustrations, descriptions, price lists and testimonials of their patent orna-

mental and field fencing. This catalogue is extremely well gotten up for the purpose, giving a great deal of valuable information to persons interested in this line.

S. Freeman & Sons Mfg. Company, Racine, Wis., have issued their first illustrated catalogue and price list of the Freeman Ensilage and Feed Cutter, containing illustrations, full description and prices. It also contains a treatise on Ensilage and Silos, which will give it additional value.

Parkhurst & Wilkinson, 148-164 Kinzie street, Chicago, Ill., issue circulars stating that they are prepared to furnish Sweet's Toe Calks, both sharp and blunt. They quote discount 40 per cent. to merchants, provided they do not sell to smiths at better than 30 per cent. The list prices remain the same: Swedish, 13 cents; American, 11 cents; Bessemer, 9 cents.

Buck Bros., Millbury, Mass., desire us to make public the following regarding the annoyance which they have suffered from the substitution of inferior goods:

A number of our customers in the Southwest have complained to us that they have been imposed upon by an unprincipled drummer who claimed to be selling "Buck Bros." goods. These merchants say "they gave their orders expecting to receive our goods, but found on opening the packages that they had got goods of an inferior make and brand." To all such merchants we beg to call attention to our standing advertisement in *The Iron Age*, which cautions "buyers to be on their guard and not have inferior goods palmed on them by unprincipled persons, who represent them as our make." All our tools are stamped "Buck Brothers" in full, and our trade-mark is on all our labels. None others are genuine.

In the *Sacramento Daily Record-Union* we find the following, which will interest the friends of a gentleman who is perhaps as widely known as any one in the trade:

Among other arrivals in Sacramento yesterday was Col. Harry Comstock, a gentleman who enjoys the reputation of being perhaps the best-traveled commercial man on the Continent. He has spent years in India, China, Egypt and other far foreign lands while pushing American manufactures to the front, and is better known among the nobility in those distant lands than many of our diplomatic agents, as his dealings have always been with Government officials. It is owing largely to Colonel Comstock's energy and business abilities that American-made arms are so largely used in the armies of China, Japan and other foreign lands, as it is in this department of commerce that his talents have been usually employed. Since then Colonel Comstock has established himself at Syracuse, N. Y., as one of the firm manufacturing the New Baker Fowling Piece. His long experience as a commercial traveler, he says, had convinced him that a great demand existed for a Gun that would equal in shooting qualities and durability the higher-priced Arms and at the same time be within the reach of sportsmen of moderate means, and this demand he claims his firm are now engaged in supplying. Having placed some orders here, Colonel Comstock departed for San Francisco, whence he will go through Texas, New Mexico and the Southern States, and will be in Sacramento again in the spring.

The new works of the Hartman Mfg. Company, at Beaver Falls, Pa., manufacturers of Patent Steel Picket Fence and Gates, and Corduroy and Diamond Fencing, are now in full operation and with the addition of two new fence machines, the firm have been enabled to catch up with their orders. The new machines are built especially for the manufacture of the Farm or Field Fence, which is the latest novelty brought out by the firm. This Fence is to compete with the wood slat picket fence which has had such a large sale through the West.

Dealers of Different Type.

In a recent issue of one of our exchanges appeared an article in which two types of dealers were described. One was designated as a man happy and contented, with plans outlined for the future and successful in this business; the other, nervous, irritable and gloomy, disagreeable to his

customers, and unable to give proper attention to those details which render a business profitable. The article sets forth the reasons for the conditions existing in both cases, and as it is of general interest to the retail store trade we take pleasure in republishing it herewith.

We have in mind a bright-eyed, rosy-cheeked business man, far past the noon meridian of life, but who seems as yet to be but a young man in tastes, habits and thought. You go into his store to call on him, and you are greeted with a pleasant word, a cordial handshake and an easy chair. He will sit down with you as if he did not have a large business depending entirely upon him for its successful operation. He looks you square in the eye and makes you feel perfectly at ease in his presence. He dismisses business entirely if you are making a social call, or he transacts business with you in a charmingly open, free-hearted manner that wins you at once to his long list of friends. He jokes with you about his age, says his life is not nearly spent yet, does not fear to die, has no pressing obligations, has good credit, can buy any amount of goods he needs without being questioned, because his credit has long been established. He gives an hour or so to you without appearing to feel that you have robbed him of an expensive article. He invites you to his house to dine with his family. He preaches to you of contentment and happiness, and is a living illustration of his text. He romps with his children, who meet him at the gate. He kisses his wife, who has the same contented smile, and his mother rises up and calls him blessed. He tells you, when you have enjoyed dinner, and are sitting out in the shade for a quiet smoke, why this is all so. To sum up the whole of his talk is one brief sentence: He is living six months ahead. He plans for the future; borrowed money when starting in business for six months, and paid it back at the expiration of three; bought goods on three months' time and paid in thirty days, and thus established his credit; gathers money together to conduct his business through six months' bad weather, bad trade, and bad markets, and keeps it there. He has a reserve capital, a reserve fund of good nature, capability and happiness. He dates all his calculations six months ahead, and is ready to carry them out when they mature. He has his life insured, his property insured, and his will made in due form. In a word, he is always ready. Do you know him?

We know a man who is nervous and irritable; his mouth is drawn into hard, set lines. Gridiron wrinkles furrow his forehead; his fingers are constantly winding about each other when disengaged. When you go into his place of business you are not apt to find him in, and you suspect (if you know him) that he is "shinning" to secure money to meet obligations. If you do find him in he will look over your shoulder while talking with you, as if constantly expecting some disagreeable visitor. If at his desk, he will nervously twist a pencil or pen in and out his fingers; he does not look at you, save for a moment at a time. If you sell him goods he buys them as a sucker takes the hook, without investigation or consideration, and you have a feeling that you have made a bad sale. He is not cordial or desirous of continuing conversation with you. He is gloomy, moody, desperate. He is constantly trying to force away disagreeable necessities until to-morrow. He has a note due at the bank to-day, but he does not pay it. He will take the three days of grace and then renew it at a high rate of interest. Interest is a famishing vulture gnawing at his vitals. He cannot attend to his business. The pain is so great that he must walk the street, get out of doors, where air and sunshine are perfectly free. His rent is not paid for last month. He has

accepted drafts which must be met, but he has no money with which to keep them from going to protest, so he preys on his friends and relatives for money to tide him over. His time is so occupied in attempting to bridge the chasm made by the growing flood of credit he himself started that he has no time to attend to his business. His subordinates have not the judgment or tact to manage as carefully as he needs, and things are going from bad to worse constantly. He exchanges checks with friends and deceives his banker as to his real condition. His employees are his creditors, and also are solicited to borrow money from friends to loan to him. His property is mortgaged to its full value. He borrows money with which to pay dividends or supposititious profits in order to deceive the innocents whom he has roped into his business. He pays no bills until he is obliged to in order to save action at law. He is a miserable man—a felon by implication. When he goes home he has no word for his wife and children, who have grown to have a little circle of their own into which the father does not enter. His mind is so worn with constant drudgery that it is near to breaking down with his credit and his business. Is there any man more pitiable? And why is he in this condition? Because he is six months behind in his calculations and his life is one continual jump, hampered as by heavy weights, to make up the six months and bring himself to date.

Engineer Menocal, of the Nicaragua Canal, just returned, gives a very flattering account of the progress of the survey. The perfected route as it now stands is at least 25 per cent. better than the one of 1885. The then estimated length of 40 $\frac{1}{2}$ miles has been cut down to 28 $\frac{1}{2}$ miles, and the minor surveys now going on are expected to reduce this to nearer 28 miles. The heaviest part of the work is the making of a cut 119 feet deep through a $2\frac{1}{2}$ mile stretch of solid rock. About 16 miles of the work will be dredged and the balance of the 9 miles is firm, low-lying ground that will only have to be dug to a depth of 20 feet. The canal is to be 120 feet wide through the greater part of the distance, with sharply sloping sides that will not have to be walled up. Through the rock section it will be but 80 feet wide with nearly vertical sides. The whole canal will have an average depth of 30 feet and will be able to accommodate the deepest draft vessels. Mr. Menocal expects to get authority to commence the work of construction at an early day.

The great majority of the convicts at present confined in the New York State prisons are idle, as the result of the passage of the prison bill at the extra session of the Legislature. As many as possible are employed in making repairs. Sing Sing alone previously turned out 3300 pair of shoes daily, and from 175 to 200 stoves.

Steamship men in New York are not in the least surprised that the Umbria arrived out on the other side many hours before the new steamship City of New York, bound to the same port, and the expectation that the latter will eventually rank among the fastest steamers afloat is in no wise diminished. To have forced the engines of the City of New York to their utmost capacity would have been ruinous, mechanically and financially. Even under the moderate stress to which she was subjected on her initial trip havoc was made with the brass boxes. Steamships might be named which developed surprising speed at the commencement of their career, beyond anything they were again able to attain. It is an unenviable reputation that is gained at so large a cost.

The Barton Bell Company.

This company have completed their factory at Marion, Ind., and are now ready to supply the wants of the trade in their line. They have two buildings, both of brick, with iron roofs. One is two stories high, 110 x 32, and constructed on the plan called "mill construction"—i. e., instead of floor and roof joists placed near each other they have girders 31 feet 6 inches in length and 14 x 8 inches running across the building 10 feet from centers upon which was laid double flooring. The second building is one story, brick, 90 x 32 feet, with steep roof, one-third pitch. The only woodwork in this building is the roof joists, window frames and sash. This latter building is the foundry, while the lower story in the two-story building is for offices and turning, polishing and plating bells, and the second story for the Strapping department and for assembling the various goods manufactured, as well as for storing the stock of finished goods. In the construction of these buildings the company have complied with the specifications recommended by the New England Manufacturers' Mutual Insurance Association, and the risk has been pronounced one of the best in the West. They have also added materially to their machinery. The rolling barrels were manufactured by Henderson Bros., Waterbury, Conn., and are constructed so that the air and dust are exhausted from the barrels, thus protecting the health of the operatives employed in that department and resulting in a superior finish to those Bells which go on the market without additional polishing. The engine is a high-speed automatic engine, manufactured by Chaudler & Taylor, Indianapolis, Ind. The boiler is made of three-eighth steel by the Erie City Iron Works, Erie, Pa. They claim to have a model plating room. The dynamo is a Mather machine, and was furnished by the Eddy Electric Company, Windsor, Conn. The polishing and buffing room is fitted up with patent spring bearing polishing lathes, which insure a steady motion of the wheels and consequently a superior class of workmanship. There is a natural gas well connected with the works, supplying an abundance of natural gas for the numerous processes requiring heat.

The company are enthusiastic as to the advantages of their new location, both as a producing and distributing point. They say: "Owing to the fertility of the soil farm produce is abundant and cheap and the price of labor is low. Marion is situated about the center of the Indiana gas field and the county wholly overlies the gas bearing stone, a failure to procure gas never having occurred in Grant County, of which Marion is the county seat. Marion is about centrally located in the circle formed by the following cities: Toledo, Detroit, Cleveland, Columbus, Cincinnati, Louisville, St. Louis and Chicago. We have three lines of railroads—the Pennsylvania system (Columbus and Chicago division); the Cincinnati, Wabash and Michigan, running from Indianapolis to Benton Harbor, Mich.; and the Toledo, St. Louis and Kansas City, running from Toledo to St. Louis. We have three express lines—the Adams, United States and American; also the Western Union telegraphic service. Marion has, in addition to natural gas, artificial gas and electric lights for illuminating, and a bountiful supply of artesian well water. Its superior geographical position, natural gas and the other advantages enumerated make it a most desirable place for the manufacture of our goods, which are consumed largely in the West and Northwest. We wish to call the attention of the trade to advantages which will accrue to them: Possibility of lessening the

cost of goods will inevitably result in lower prices to the consumer; the great saving in freight rates owing to our favorable location, and the fact that they will be able to procure quickly Sleigh Bells, which are generally wanted at once or not at all.

Recent Legal Decisions.

TRADE-MARK—DAMAGES FOR INFRINGEMENT.

F., a dealer in shoes, used the trade-mark of B.—"C. Benkert & Son"—on 250 dozen pairs of boots and shoes, and a suit was brought for the infringement. The damages claimed were the profits made on the goods sold, but defendant insisted that he should account only for the difference these boots and shoes would have sold for without the plaintiff's trade-mark on them, and the price at which they were sold with the trade-mark on them. In this case—Benkert *vs.* Fider—brought in the United States Circuit Court, Northern District of California, the court gave the plaintiff the full profits. Judge Sawyer, in the opinion, said: "The rule of damages insisted upon by the defendant is not the proper measure of damages. I am unable to adopt any such rule. It would be extremely indefinite, and equivalent to giving no damages or profits at all. How would it be possible for any one to say how much less a pair of boots or shoes would sell without than with the trade-mark upon it? There would be no definite measure of compensation for the injury. One who deliberately and knowingly uses another's trade-mark commits a palpable and unmitigated fraud, for which there is no possible excuse. He seeks to avail himself of the good reputation of another's goods, and puts his own goods—which are, usually, if not always, of an inferior quality—upon the market, thereby not only fraudulently cutting off the market from the party who by years of labor, and at great expense, has established a reputation for his wares, but in addition to this injury destroys or injures largely that reputation which is the foundation of the owner's business, by selling inferior goods under his trade-mark, thereby leading the world to believe that these inferior goods are those of the genuine maker. In my judgment the defendant should account, at least, for the entire profit made by him on the sale of the goods with the fraudulent trade-mark on them. There is no just analogy with respect to profits and damages between the infringement of a trade-mark and a patent for an improvement in a machine. A machine may embrace inventions for half a dozen improvements, for each of which a patent is held by different individuals. One machine might infringe them all, and then each patentee could recover the profit attributable to his separate invention. The trade-mark sells the whole article, however inferior or injurious in that particular, and prevents the sale of the owner's goods of equal amount. At least that is the fraudulent purpose and the natural tendency, whether always accomplished or not; and the injured party should have, at least, the whole profit resulting from the wrongful act, and such I understand and hold the rule to be. The damage may be much more arising from destroying the reputation of the owner's goods."

ASSIGNMENT FOR BENEFIT OF CREDITORS.

L. made a general assignment to A. on October 26, and A. at once went into possession and began to sell the property. On November 12 L. died, but A. continued to sell and dispose of the property after his death. Two months after L.'s death the balance of the stock was sold at auction, and A. applied most of the proceeds to the

preferred debts specified in the judgment. An unpreferred creditor attacked A.'s course, and sought to hold him personally liable for the appropriation of the property, but was defeated in the action, *Chattanooga Stove Company vs. Adams*, and an appeal was taken to the Supreme Court of Georgia, where the judgment was affirmed. Judge Simmons, in the opinion, said: "Though we do not agree with the court below that the assignment was valid, yet no fraud being alleged in making it, and it being shown that the assignee has acted throughout in good faith, we cannot hold him liable as one acting as an executor without authority can be held liable. This is not a case where a person intermeddles after the death of person with the goods of the deceased, but is one where the owner has put him into possession, under a deed, before his death."

ATTACHMENT—MALICIOUS ACTION.

H. & Sons were creditors of B. & McC., and they could not make a prompt collection of their bill for goods sold, and they caused an attachment to be issued, on the ground that B. & McC. were about to dispose of their property to defraud their creditors. H., who made the affidavit, said he thought he had good grounds for his action; that he had called on the firm for payment, and that B. had said to him that McC. was neglecting the business, by frequenting drinking saloons during business hours, putting the whole burden on him, and that he, H., took the course he did fearing that a chattel mortgage would be put on the stock in trade. B. & McC. were solvent, and before the attachment was served the debt was paid. But the sheriff's officer remained in the store, refusing to leave, though B. assured him that the debt had been paid, until he, B., brought word from H. & Sons that there was no claim; and he did remain until a clerk from H. & Sons came and told him that the matter had been arranged. And the principal daily paper in the city stated: "In the Superior Court, yesterday, I. H. Hinchman & Sons swore out an attachment against Charles R. Brand and Gilbert McCullough." Damages were shown in the suit brought for malicious prosecution, and a judgment was recovered for \$625 in the case, *Brand vs. Hinchman*, and the defendant appealed to the Supreme Court of Michigan, where an affirmance was had. Judge Morse, in the opinion, said: "Defendants contend that an action for malicious prosecution will not lie unless there has been a seizure of property, or the arrest of a person, but here there was, at least, a technical taking possession of property. 2. It is further contended that the action will not lie for a civil action based upon a claim, but we are notified that this action is maintainable. Plaintiffs show they were damaged by the course taken, and that there was no reasonable ground for the attachment. There are few, if any, wrongs for which the law does not provide a remedy, and if a man is hurt or damaged in his property, business, credit or reputation by the malicious commencement or prosecution of a civil suit, without probable cause, the better doctrine is that he can maintain an action for his hurt or damage."

Since July 1, 1888, Fairbanks & Co., St. Louis, have sold 14 Westinghouse engines, aggregating 1280 horse-power. They are now preparing plans for the power plant of the Omaha and Council Bluffs Bridge and Railways Company's electric railway.

An alleged discovery of nickel in Logan County, Kansas, causes much excitement in that region

Lavigne's Breech-Loading Yacht Cannon.

An improved saluting cannon for yachts, known as the Lavigne patent breech-loader, has been recently brought out by R. H. Brown & Co., New Haven, Conn. Fig. 1 shows the general appearance of the cannon, and Fig. 2 illustrates the working of the breech block. The special feature to which the manufacturers

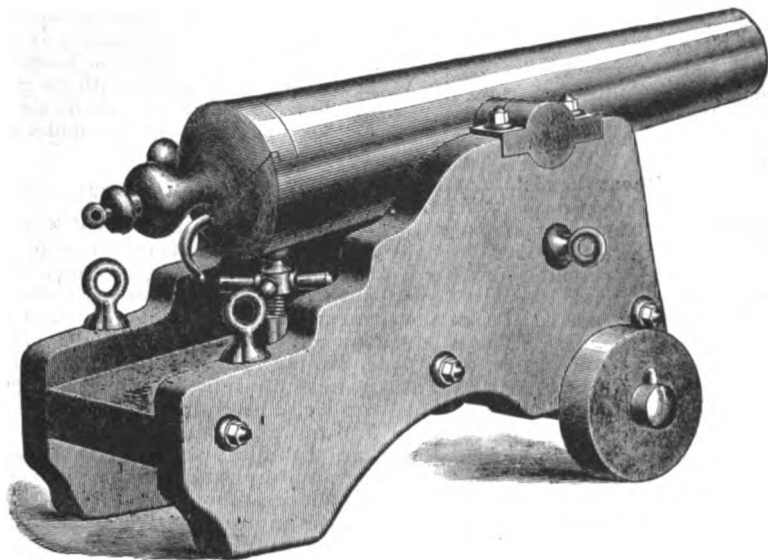
inches, and they also inform us that muzzle loading can be remodeled into breech loading guns with this block. The Lavigne cannon is designed to take standard shot shells, either paper or brass, thus avoiding the trouble of having special shells made to order.

At last Louisville, Ky., has a genuine cotton factory in course of erection which will be completed and running by Decem-

the machinery, &c., and Mr. Lane, manager of above factory, will be manager and superintendent of the new works, the old small concern being absorbed by the new company. The capital stock of the company is \$500,000, with \$200,000 paid in. The president is W. A. Robinson, and the directors are from among the most energetic and successful men of the city. The product of the mill will be entirely warp, and they will begin with an order for \$80,000 from one woolen factory. If the warp mill meets with ready success as is expected, the company will next year put up another factory, to run on sheetings and plaids.

The Eon Fence Post.

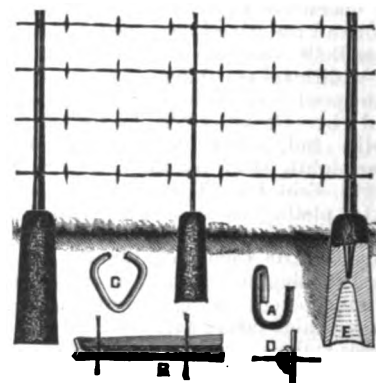
A very practical metal fence post has been invented and patented by Charles S. Long, of Aurora, Ill. The constantly increasing scarcity of timber in many parts of the country caused his attention to be drawn to this matter, and, after years of experiment, he has perfected the Eon post. It is clearly shown in the accompanying illustration, which also covers details of the various parts. It consists of an iron or steel bar, with a base of asphaltic concrete, crushed or pulverized stone pressed on it while hot by a powerful machine. The bar is of trigonal section, as shown by B in the cut, although



Lavigne's Breech-Loading Yacht Cannon.—Fig. 1.—Breech Closed.

direct attention is the strength and simplicity of the breech block mechanism. Fig. 1 shows the breech block swung around to permit loading. It will be noticed that the pivot is directly above the bore, the advantage claimed for this construction being that the pressure is equally distributed, so that there is no danger of the breech opening when the cannon is discharged. Furthermore, the heavy rib B, Fig. 2, which, as shown, ex-

ber 1st. The Louisville Cotton Mills Company have located their plant at the intersection of the Short Line Railroad and Shelby street. They have 17 acres of ground and a frontage of 600 feet on the railroad. A switch has been run in, by which they are receiving the heavy materials for construction. The warehouse is nearly completed, measuring 150 x 60 feet, and is for storing both raw material and stock. The factory is in course of



The Eon Fence Post.

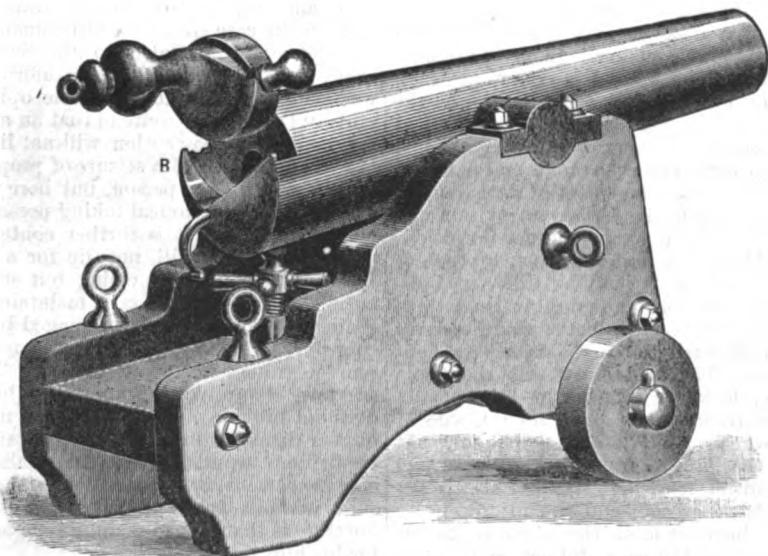


Fig. 2.—Breech Open.

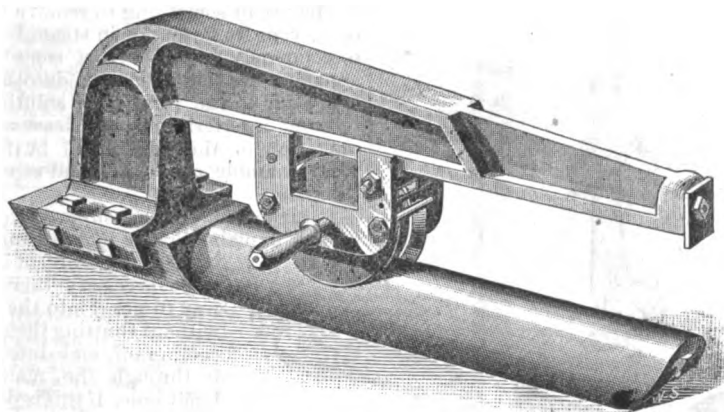
tends above the bore, gives a strong support to the breech block. Another feature of this arrangement is that it allows for an increased length of barrel, from 2 inches on the small size to 6 inches on the large size. To fire the cannon a lanyard is attached to the pin A, Fig. 2, and pulled directly back, thus releasing the hammer which explodes the primer. Messrs. Brown & Co. are preparing to furnish the cannon in sizes of 12, 18, 24 and 28

erection, and will be 305 x 78 feet, three stories high. There will also be engine house and dye houses. The engine is an Eastern Corliss, 400 horse-power, made at Providence, R. I. All of the machinery is new and made expressly for this mill. It was designed by Eastern experts. Home capital almost entirely controls the enterprise. Mr. J. L. Peck, owner of a small warp mill formerly operated in Louisville, has the direction of purchasing

other shapes could be made, if desired. Each revolution of the rolls make one post, which can thus be easily tapered, so as to be heaviest at the place most likely to be broken. Nibs on the rolls 1 inch apart leave a thin web, which can be punched out to space fence wires as wished. In the cut A represents the stay for fastening the fence wire to the post; C holds the wire in the loop of the stay; D shows how C is used. The stay is made of No. 1 stiff wire. Boards can be used with these posts as well as wires. An ordinary post will contain about 5 pounds of metal. The base, as will be seen by the part cut away at E, has a cavity in the bottom, which adds to its rigidity when in position. A special machine, designed and patented by Mr. Long, is used for pressing the bases on the posts, pressing on five per minute. This base is claimed by the inventor to be moisture and water proof, so that frost cannot disintegrate or crack it, while at the same time there is no seam or crevice between the post and the base, so that water cannot enter to rust the metal nor can frost take effect at that point. The inventor desires to make arrangements for the manufacture of this post on royalty, and solicits correspondence. The arrangement will include the right to use his patent press for the bases. He further states that they can be produced at very low cost.

New Grooving Machine.

A. V. Allen, Joplin, Mo., is introducing a new form of grooving machine, an idea of which will be gained from the accompanying engraving. The lower part of the machine consists of a common hollow mandrel, a tool well known to all sheet-metal workers. Above this is fast-



New Grooving Machine, Made by A. V. Allen, Joplin, Mo.

ened a goose-neck under which runs the grooving roll. Mr. Allen informs us that any mandrel may be used, provided it is straight, or the machine is supplied fitted to the mandrel, as the preferences of the buyer may be. Special attention is directed to the fact that the power is applied directly to the grooving wheel, and that no complicated gearing is required. The features of construction in the machine are so clearly shown in the cut that extended description is unnecessary. The maker asserts that this machine is the result of long experience, and the careful trial of a considerable number of those machines which have preceded it in the market.

The Suez Canal is the cause of atmospheric changes which may have an effect of great importance in shaping the destiny of Egypt. Rains are now falling in Cairo and along the delta of the Nile, before almost unheard of. Dr. Chas. S. Robinson, of this city, notices the arrival of "new forces of disruption from without," and climatic changes most unexpected and peculiar, so that even the mummies, so long preserved in their dry cerements, are now liable to perish from the presence of moisture, before unknown, which percolates through their rocky covering. He says: "Whereas at least until 1878 such a thing as rain was entirely unknown in Cairo, there is nowadays one perpetual and almost tropical downpour, commencing in November and lasting until March," which accounts for the prevalence of typhoid and other forms of malarial fever. And, as might be expected, the manner of constructing dwellings and the mode of life are undergoing a radical change. Roofs must now be made water-tight and "fire-places and stoves have already made their appearance," instead of the old-time open braziers. The prospect of a new market for stoves, so near the equator, and from causes so remarkable, will scarcely escape the attention of American manufacturers.

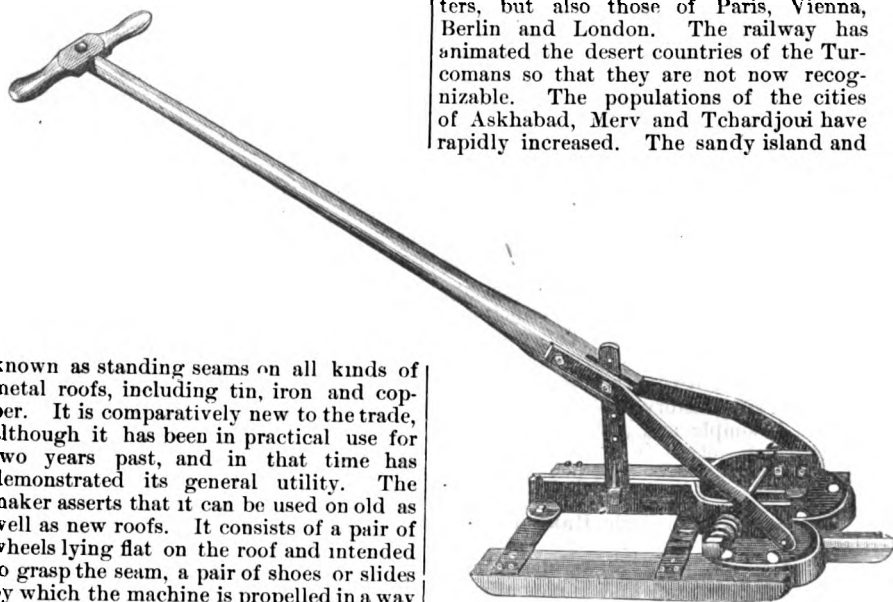
A fatal collision of the Pacific steamers City of Chester and Oceanic a week ago inside the Golden Gate was almost a repetition in its general features of the disaster that befel the Geiser and Thingvalla off Newfoundland a week before. In the latter case sight was obscured by heavy rain, while the City of Chester was run into amidships during a thick fog, the consequence of which was that she instantly sank in deep water, with a loss of 13 lives. Until there

is some method of signalizing by means of light or sound when the weather is thick, collisions at sea are unavoidable.

New Double Seamer.

F. P. Baldwin, of Baldwinsville, N. Y., is introducing a new machine for compressing the double seams on rib or raised

seam roofs. A general view of the device is presented in the first of the accompanying engravings, while the other illustrations show the work performed by it at different stages of the operation. The machine is designed for closing the seams



New Roofing Double Seamer.—Fig. 1.—General View of Baldwin's Seam Compressor.

known as standing seams on all kinds of metal roofs, including tin, iron and copper. It is comparatively new to the trade, although it has been in practical use for two years past, and in that time has demonstrated its general utility. The maker asserts that it can be used on old as well as new roofs. It consists of a pair of wheels lying flat on the roof and intended to grasp the seam, a pair of shoes or slides by which the machine is propelled in a way to avoid injury to the roofing, and the handle for operating. The wheels are adjustable, so that the seam can be closed more tightly at the bottom than at the top, thereby securing a water-tight seam and at the same time avoiding the danger of cracking the metal at the top of the seam. In using this device the seams are turned in

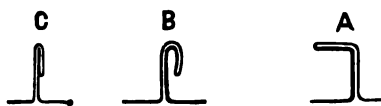


Fig. 2.—Different Stages of the Work.

the usual way. After the double seam is turned as shown in Fig. B of the second engraving, which may be accomplished with the mallet or tongs, the compressor is put in place and pushed down the roof. The effect of the machine is shown in C of the engraving referred to. The maker advises in the use of this machine the keeping of the springs loose at the outset and

tightening them up as familiarity with the machine is gained. The maker claims that in using this machine an absolutely watertight seam is produced; further, that the work is done faster and easier than by the old plan, and that the seams are uniform and more perfect than can be produced in any other way. At the intersection of the standing seam with the cross-seams, the latter, it is claimed, are closed more perfectly than can be accomplished by any other device now in use. The further advantage, to which allusion is made in the circular before us, is that the use of this device avoids heavy and laborious stamping, and does not jar the roof, which, in many cases, is very objectionable. A number of testimonials are presented from those who have used this device, all speaking of it in the highest terms, and several referring to the use of this device on roofs which had been leaky and which were entirely cured by this plan.

About three months ago there was completed in Russia a railway nearly 900 miles in length, connecting Central Asia with all important points in Russia, called the Trans-Caspian. Respecting its commercial importance a correspondent of the *Journal de St. Petersburg* recently wrote: "What an immense field is opened to commerce by the new line! Thanks to it, the rich Turcoman carpets, the wool of merinos, the silk of Bokhara, the leather, the silk stuffs of Samarcand and the products of the minor industries of these countries can in 12 or 13 days not only reach the Russian commercial centers, but also those of Paris, Vienna, Berlin and London. The railway has animated the desert countries of the Turcomans so that they are not now recognizable. The populations of the cities of Askhabad, Merv and Tchardjoui have rapidly increased. The sandy island and

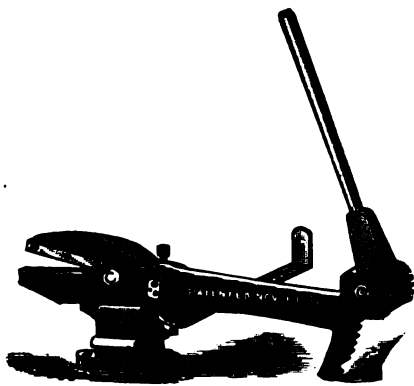
desert of Ouzoun-Ada are transformed into a bay of the first order, with a town having its streets, squares, bazars and a church. It is entirely owing to the railway that the gigantic undertaking of the restoration of the dyke of Sultan-Bent, on the Mourgah, destroyed 300 years ago, can be executed, and thereby call back into life the ancient granary of Central Asia."

The steamship City of Birmingham sailed from Savannah on Friday for Philadelphia with a cargo of 2100 tons of pig iron brought from Alabama furnaces by the Georgia Central Railroad.

Findlay, Ohio, now has six gas wells all "gushers," whose combined capacity is about 40,000,000 cubic feet of gas per day.

The Eureka Shear.

The Smith & Egge Mfg. Company, Bridgeport, Conn., are offering the trade a very effective tool for cutting wire rods and sheet metal in strips, a view of which is presented in the accompanying illustration. From an inspection of the engraving it will be seen that the device consists of a stock shear, the jaws of which are actuated by a rack and pinion movement. At the end of one arm of the shear is a segmental rack, in which engages a pinion attached to the second arm of the shear. The pinion is turned by a lever, clearly shown in the engraving. By this arrangement of parts great power is secured. Attached to the jaws, and projecting at right angles to them, is a gauge for convenience in cutting metal to length. In cutting round wire steel dies are inserted in the shear, and these are adjustable for different sizes. In the construction of the dies and cutters we are informed that the best tool steel is employed. As will be seen from the engraving, provision is made for attaching the shear to a bench, or, if preferred, it can be placed securely in a vise.

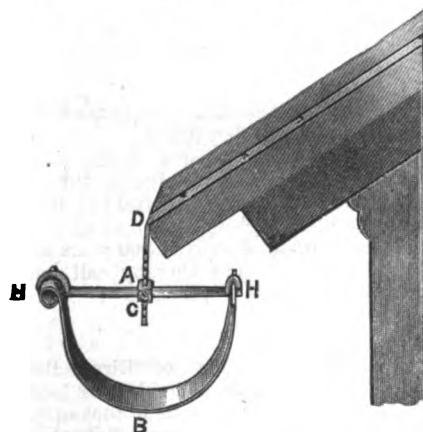


The Eureka Shear.

It is made in two sizes, No. 1 cutting round metal up to $\frac{1}{4}$ inch and sheet metal up to $\frac{1}{2}$ inch, while No. 2 has a capacity for cutting round metal up to $\frac{1}{2}$ inch and sheet metal up to $\frac{3}{4}$ inch. The company claim that the device can be operated with great ease, that it is very convenient in a metal-working factory or hardware store, that it is simple and durable, and of a price which places it within the reach of all.

New Eave-Trough Hanger.

Mr. Henry B. Todd, of Meriden, Conn., has recently patented and is now offering to the trade an improved adjustable eaves-



New Eave-Trough Hanger.—Fig. 1.—Hanger Applied to Trough and Fastened to the Roof.

trough hanger, the general construction of which is indicated in the accompanying engravings. Fig. 1 of the illustrations

shows the hanger in position, while Fig. 2 represents the cross-bar and strap. It will be found convenient for reference to bear in mind that similar letters indicate similar parts of the hanger. In the engraving

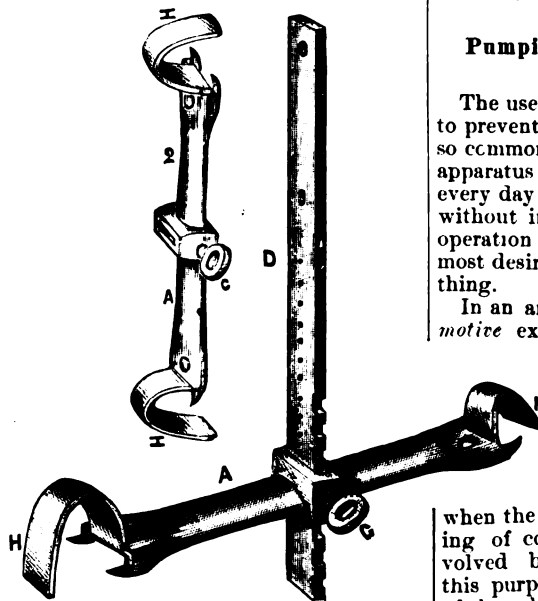


Fig. 2.—Cross Bar and Strap.

ings A represents a cross-piece of malleable iron, provided at each end with two sharp projections or points. Between the latter, and fastened to each end of the cross-bar, is a clasp H H, designed to fold over the edges of the trough and force the points above referred to through the metal composing it. This is accomplished by means of special tools furnished by the manufacturer. The strap D, shown in Fig. 2, inserted in the cross bar, is provided with notches at one end, into which is turned a set-screw, firmly holding it in place. The dots upon the side of the strap are designed for convenience in giving the trough the proper pitch or slant. The first strap is intended to be bent at the first dot, as at D, Fig. 1; the second strap at the second dot, and so on for as many hangers as are required for any particular trough. This, it is claimed, will give the proper slant, provided the building is level, but if not the trough can be lowered still further by means of the notches and set-screw already mentioned. In fastening the cross-bar to the trough the edge of the latter is inserted between the two projections and the clasp, as shown at H, the points being forced through the tin by compressing the clasp. The points on the opposite end are forced through under the sole, while the strap clasps it on the outside. By this means the cross-bar is attached to the trough in a very substantial manner, and without the use of solder. The manufacturer states that special machinery and tools have just been completed for making the clasps shown at H H in the engravings of the toughest kind of wrought material. The parts are formed and riveted to each end of the cross-bar, as shown in Fig. 2 of the illustrations, when the whole is neatly tinned. The maker claims that the use of these fasteners save much time and labor in putting up eave-troughs, and at the same time present a very neat appearance. The use of these hangers is said to allow of the adjustment of the trough at any pitch desired, and also of its easy removal for painting or repairs. The hanger is very durable in all its parts, and has been thoroughly tested. The goods are packed for shipment in one gross boxes, the straps varying in length from 8 to 12 inches.

A director of Denver says the coal traffic of the road is enormous, the Rock Island alone taking 1000 tons per diem, and ship-

ments are made over the Quincy as far as Lincoln, Neb. Anthracite is shipped as far as Kansas City and there competes with the Eastern product. Equipment is behind necessities. More locomotives and cars will be ordered.

Pumping Solvents into Boilers.

The use of something to remove scale or to prevent its formation in steam boilers is so commonly necessary that some sort of apparatus for introducing it into a boiler every day in the form of a solution, and without interfering in the least with the operation of the boiler, will be found a most desirable, convenient and economical thing.

In an article on the subject the *Locomotive* explains that in most steam plants if the use of a solvent is found to be necessary there is no way to get it into the boilers without shutting them down, cooling off, and introducing it through the manhole or hand-hole. If this is done only

when the boilers are opened up for cleaning of course no extra expense is involved but as a rule the stoppages for this purpose are so far apart that the use of the solvent amounts to very little, as in the natural course of running it will be entirely blown out and lost long before the next charge can be introduced. If a stop is made as often as the solvent should be introduced for the special purpose of putting it in, great and unnecessary expense is involved. The loss entailed by one such stoppage would more than pay for a proper apparatus for introducing it daily or oftener if desired, and in the form of a solution. And it is plain that small quantities in solution introduced at short intervals will be much more effective than a large quantity at longer intervals, and, when water is very bad, a much greater quantity of the solvent can be used in a given time than can be where large quantities are put in at longer intervals. For illustration, with some waters a charge of 30 pounds of soda ash once a month might cause serious trouble for a while after it was put in, but 1 pound a day could not possibly injuriously affect the working of the boiler.

Our contemporary accordingly gives an engraving of a very simple apparatus for attaining the desired result. It can be attached to any pump or injector at a very slight expense. To the upper end of the suction pipe of the feed pump another pipe is connected by means of the T, and extended to any convenient height. This pipe is provided with a stop valve, and carries on its upper end a receptacle for the solution which it is desired to put into the boiler. This may be an iron or a wooden vessel, as may be preferred, and of any required size. This vessel is filled with the solution while everything is running as usual. If the pump is drawing its supply, the only thing necessary to do is to open the valve connecting with the vessel above and its contents will be put into the boiler with a few strokes of the pump, when the valve may be again closed until it is wanted for use again. If, on the contrary, the pump is drawing its supply from some source which exerts pressure, more or less, as is frequently the case, the stop valve in suction pipe should be closed while the connection to the open vessel of solvent is open, or it would be driven out of the top of the vessel. But in either case a few moments suffice to complete the operation without any interruption to the operation of pump or boilers.

The Germans have successfully established themselves at 14 trading ports on the coast of Zanzibar.

AUGUST 29. 1888.

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World's Best. # gross. No. 1, \$12.00; No. 2, \$24.00.	
No. 3, \$36.00.	
Universal. # dos \$5.00, dis 35.55	
Domestic. # dos \$3.50, dis 45	
Champion. # dos \$2.00, dis 50	
Cards.	
Horse and Curry. # dis 10.10 @ 10.10 @ 10.10	
Cotton. New List, Aug., 1883, dis 10 @ 10.10	
Wool. # dis 10 @ 10.10	
Carpet Stretchers.	
Cast Steel. # dos \$12.35	
Cast Iron, Steel Points. # dos \$0.4	
Socket. # dos \$2.00	
Ballard's. # dis 25 @ 25.10	
Carpet Sweepers.	
Bissell No. 5. # dos \$17.00	
Bissell No. 7 New Drop Pan. # dos \$19.00	
Bissell Grand. # dos \$30.00	
Grand Rapids. # dos \$24.00	
Crown Jewel. No. 1, \$18; No. 2, \$19; No. 3, \$20	
Magic. # dos \$15.00	
Jewel. # dos \$17.00	
Myrtle. # dos \$16.00	
Outrage. # dos \$18.00	
Garland. # dos \$18.00	
Parlor Queen. # dos \$18.00	
Housewife's Delight. # dos \$18.00	
Queen. # dos \$18.00	
Queen, with band. # dos \$18.00	
Kings. # dos \$30.00	
Weed Improved. # dos \$18.00	
Hub. # dos \$18.00	
Cog Wheel. # dos \$16.00	
Cartridges.—See Ammunition.	
Casters.	
Bed. # New List: # Braas. dis 55 @ 55.55	
Plate. # Others. dis 60 @ 60.55	
Shallow Socket. # dis 40.10	
Deep Socket. # dis 40.10	
Tale Casters, list May, 1884. # dis 30.10 @ 40	
Eale, Gem. # dis 30.00 @ 50	
Martin's Patent (Phoenix). # dis 40.10 @ 50	
Payson's Anti-Friction. # dis 60 @ 60.10	
"Giant" Truck Casters. # dis 10 @ 10.55	
Stationary Truck Casters. # dis 45.10	
Cattle Leaders.	
Hudson, Beckley & Co.'s. # dis 70	
Bargen's. # dis 60 @ 210	
Stocks. # dis 30	
Pack Stow & W. Co. # dis 50.10	
Chains.	
Trace, 6-10-2, exact sizes. # pair. \$1.03	
Trace, 6-10-3, exact sizes. # pair. .92	
Trace, 7-10-2, exact sizes. # pair. 1.11	
Traces.—Traces, "Regular" sizes 35 net # pair less than exact.	
Log, Fifth, Stretcher, and other fancy Chains, list Nov. 1, 1884. # dis 50.10 @ 50.10 @ 50.10	
American Coll 3-16 # 5-16 # 7-16 # 9-16	
In cast lots, 8.75 @ 8.25 6.00 @ 4.50 4.00 @ 3.75 3.50	
Less than cast lots, add 1/4 @ 1/2 #	
German Coll, list of June 20, 1887. # dis 50.10 @ 50.10	
Ser. Halter Chain, list of June 20, 1887. # dis 50.10 @ 50.10	
Covert Halter, Hitching and Breast.	
Covert Traces. # dis 35 @ 2	
Onedale Halter Chain. # dis 60 @ 60.55	
Galvanized Pump Chain. # dis 5 1/2 @ 6	
Jack Chain, Iron. # dis 70.10 @ 75	
Jack Chain, Brass. # dis 55 @ 70	
Chalks.	
White. # gro 50	
Red. # gro 70	
Blue. # gro 85	
White Crayons. # gro 12 @ 12 1/2	
Chains Limes.—See Limes.	
Chisels.	
Socket Framing and Firmer—	
P. S. & W. # dis 75.55 @	
New Haven and Middlesex. # 75.10 @	
Mix. # dis 30	
Buck Bros. # dis 60.10 @ 60.10 @ 60.10	
Merrill. # dis 30 @ 30.55	
L. & J. White. # dis 75 @ 75.55	
Witherby and Douglass. # dis 40.10	
Tanged Firmers. # dis 40.10	
Tanged Firmers, Butcher's. # dis 40.10	
Tanged Firmers, Spear & Jackson's. # dis 30	
Tanged Firmers, Buck Bros. # dis 30	
Cold Chisels. # 16 @ 16	
Chucks.	
Seach Patent. # each, \$3.00, dis 30	
Morse's Adjustable. # each, \$7.00, dis 30 @ 30.55	
Danbury. # each, \$6.00, dis 30 @ 30.55	
Syracuse, Bals Pat. # dis 25	
Clamps.	
Providence Tool Co.'s Wrought Iron. # dis 25	
Adjustable, Gray's. # dis 20	
Adjustable, Lambert's. # dis 20	
Adjustable, Snow's. # dis 40.55	
Adjustable, Hammer's. # dis 15	
Adjustable, Stearns'. # dis 20.10	
Stearns' Adjustable Cabinet and Corner. # dis 50.10	
Cabinet, Sargent's. # dis 60.10	
Carriage Makers', Sargent's. # dis 60.10	
Eberhard Mfg. Co. # dis 40.55 @ 40.10	
Warner's. # dis 40.10 @ 40.10 @ 40.10	
Saw Clamps. # See Vices	
Clips.	
Norway, Axle, 1/2 & 5-16. # dis 55 @ 55.55	
Second grade Norway Axle, 1/2 & 5-16. # dis 55 @ 55.55	
Superior Axle Clips. # dis 60.55 @ 60.55 @ 60.55	
Norway Spring Bar Clips, 5-16. # dis 60.55 @ 60.55	
Wrought-Iron Felloe Clips. # dis 50	
Steel Felloe Clips. # dis 50	
Baker Axle Clips. # dis 50	
Locks. # dis 50	
Coaks, Brass.	
Hardware list. # dis 40.10 @ 40.10	
Coffee Mills.	
Box and Side, list revised Jan., 1888. # dis 50.10	
American, Enterprise Mfg. Co. # dis 50.10 @ 30	
The "Swift" Lane Bros. # dis 20.10	
Compasses, Dividers, &c.	
Compasses, Callipers, Dividers. # dis 70 @ 70.10	
Bemis & Call Co.'s Dividers. # dis 60.55	
Bemis & Call Co.'s Compasses & Callipers. # dis 50.55	
Bemis & Call Co.'s Wing & Inside or Outside. # dis 50.55	
Bemis & Call Co.'s Double. # dis 60	
Bemis & Call Co.'s (Call's Patent Inside). # dis 30	
Excelsior. # dis 50	
J. Stevens & Co.'s Callipers and Dividers. # dis 50.10	
Coppers' Tools.	
Bradley's. # dis 20	
Barton's. # dis 20 @ 20.55	
L. & J. White. # dis 20.55	
Albertson Mfg. Co. # dis 25	
Beatty's. # dis 40 @ 40.55	
Sandusky Tool Co. # dis 30 @ 30.55	
Corkscrews.	
Hudson & Beckley Mfg. Co. # dis 40 @ 40.10	
Clough's Patent. # dis 35 @ 35.55	
Howe Bros. & Hubert. # dis 35	
Corn Knives and Cutters.	
Bradley's. # dis 10	
Wadsworth's. # dis 25	
Cradles.—Crain.	
Crain. # dis 50.10	
Crow Bars.	
Cast Steel. # dis 40	
Iron, Steel Points. # dis 3 1/2	
Curry Combs.	
Fitch's. # dis 60.10 @ 60.10 @ 10	
Rubber. # dis \$10.00, dis 20	
Perfect. # dis	

Curtain Pins.	
Silvered Glass. # net	
White Enamel. # net	
Cutlery.	
Beaver, Kalm and Booth's. # dis \$3.4	
Wostenholme. # \$7.75 to \$	
Dampers, &c.	
Dampers, Buffalo. # dis 50	
Buffalo Damper Clips. # dis 50	
Crown Damper. # dis 40	
Excelsior. # dis 40.10	
Dividers.—See Compasses.	
Eng. Cellars.	
Embossed Gilt, Pope & Stevens' list. # dis 30.10	
Leather, Pope & Stevens' list. # dis 40	
Brass, Pope & Stevens' list. # dis 40	
Door Springs.	
Torrey's Rod, regular size. # com \$1.30	
Gray's. # gro. \$20.00, dis 20	
See Rod. # gro. \$20.00, dis 20	
Warner's No. 1. # dos \$3.50; No. 2, \$3.30; dis 40.10 @ 35	
Gem Coll, list April 19, 1885. # dis 10	
Star Coll, list April 19, 1885. # dis 20	
Victor (Coll). # dis 60 @ 60.10	
Champion (Coll). # dis 60.10 @ 60.10 @ 10	
Philadelphia. # 5 in. \$5.00; 8 in. \$7.75, dis 30	
Cowell's. No. 1. # dos \$18.00; No. 2, \$16.00, dis 50	
Rubbers, complete. # dos \$4.50, dis 50	
Hercules. # dis 50	
Shaw Door Check and Spring. # dis 25 @ 30 @ 35	
Elliot's Door Check and Spring. # dis 25	
Drawings Kelves.	
P. S. & W. # dis 75.55 @	
Mix. # 75.10 @	
New Haven and Middlesex. # dis 60.10 @ 60.10	
Witherby and Douglass. # dis 70 @ 75.55	
Watrous. # dis 15.10 @ 25	
L. & J. White. # dis 20.55	
Bradley's. # dis 35	
Adjustable Handle. # dis 25 @ 35.55	
Wilkinson's Folding. # dis 25 @ 25.55	
Drills and Drill Stocks.	
Blacksmith's. # each, \$1.75	
Blacksmith's Self-Feeding. # each, \$7.50, dis 30	
Breast, P. S. & W. # dis 40.10	
Breast, Wilson's. # dis 30.55	
Breast, Millers Falls. # each, \$3.00, dis 25	
Breast, Bartholomew's. # each, \$2.50, dis 25 @ 40	
Ratchet, Merrill's. # dis 30	
Ratchet, Ingersoll's. # dis 30 @ 25	
Ratchet, Parker's. # dis 30 @ 20.55	
Ratchet, Whitney's. # dis 20.10	
Ratchet, Weston's. # dis 20.25	
Ratchet, Moore's Triple Action. # dis 25 @ 30	
Whitney's Hand Drill, Plain. \$1.00. Adjustable. # dis 20.10	
Wilson's Drill Stocks. # dis 15	
Automatic Boring Tools. # each, \$1.75 @ \$1.60	
Twist Drills.	
Morse. # dis 50.10 @ 50.55	
Standard. # dis 50.10 @ 50.55	
Syracuse. # dis 50.10 @ 50.55	
Cleveland. # dis 50.10 @ 50.55	
Williams. # dis 50.10 @ 50.55	
Drill Bits.—See Augers and Bits.	
Drill Chucks.—See Chucks.	
Drilling Pans.	
Small sizes. # \$ 6.55 @	
Large sizes. # \$ 6.55 @	
Eng. Sectors.	
J. Dover. # dis 32.00	
National. # dis 32.00	
Family T. & S. Mfg. Co. # dis \$4.50, dis \$3.4	
Kingston Standard Co. # gro. \$17.00 @ \$18.00	
Acme Standard Co. # gro. \$6.00	
Duplex Standard Co. # gro. \$15.00	
Duplex, extra heavy. # dis extra \$5.00	
Rival (Stan and Co.). # gro. \$2.00	
Triumph (T. & S. Mfg. Co.). # gro. \$10.50 @ \$11.50	
Advance No. 1. # gro. \$10.50	
Advance No. 2. # gro. \$10.00	
Bryant. # gro. \$15.00	
Avon's Spiral. # gro. \$5	
Double (Hamblin & Russell Mfg. Co.). # gro. \$16.20	
Key (Hamblin & Russell Mfg. Co.). # gro. \$14.00	
Triple (Hamblin & Russell Mfg. Co.). # gro. \$12.20	
Spiral (Hamblin & Russell Mfg. Co.). # gro. \$4.50	
Paine, Dient & Co's. # gro. \$24.00	
Egg Poachers.	
Buffalo Steam Egg Poachers, # doz., No. 1, \$6.00; No. 2, \$9.00. # dis 25	
Electric Reel Sets.—Wollensak's. # dis 15	
Bigelow & Dowse. # dis 20	
Emery.	
No. 4 to No. 54 to Flour, CF	
46 gr. 150 gr. F FF.	
Kegs, # 5 @ 2 1/2	
4 kegs, # 5 @ 2 1/2	
10 kegs, # 5 @ 2 1/2	
10 kegs, 10 in. cans. # 5 @ 2 1/2	
10 kegs, less than 10 in. # 5 @ 2 1/2	
Enamels and Tinned Ware.—See Hollow Ware.	
Reamteches Pins.	
Iron, list Nov. 11, 1884. # dis 60.10 @ 60.10 @ 5	
Brass. # dis 60 @ 60.55	
Reamteches.	
Door Lock. # Same discounts as Door Locks	
Brass Thread. # dis 60 @ 60.10	
Wood. # dis 25	
Planets.	
Fenn's. # dis 40	
Bohren's Patent Rubber Ball. # dis 25	
Fenn's Cork Stops. # dis 35.4	
Star. # dis 60 @ 60.55	
Fraser's Patent Petroleum. # dis 40.10 @ 40.55	
West's Patent Key. # dis 50.10	
Anchor Lock. # dis 45	
Metallic Key, Leather Lined. # dis 60.10 @ 60.10 @ 10	
Cork Lined. # dis 70.55 @ 70.10	
Burnside's Red Cedar. # dis 50	
Burnside's Red Cedar, bbl. lots. # dis 60.10	
J. Sommer's Best Block Tin Key. # dis 40	
J. Sommer's Cork Lined, 1st quality. # dis 50	
J. Sommer's Diamond Lock. # dis 40	
J. Sommer's Perfection, Fla. Red Cedar. # dis 50	
J. Sommer's Goodenough Cedar. # dis 60	
Self-Measuring, Enterprise. # dos \$36.00—dis 20.10	
Self-Measuring, Lane's. # dos \$36.00—dis 25.10	
Self-Measuring, Victor. # dos \$36.00—dis 25.10	
Self-Measuring, White. # dos \$36.00—dis 25.10	
Fifth Wheel. # Derry and Cincinnati, dis 45.55 @	
Files.	
Nicholson Files, Rasps, &c. # dis 60.55 @ 60.10	
Nicholson (X. F.) Files. # dis 25	
Nicholson's Royal Files (Seconds) dis 75 (extra prices on main sizes)	
Other makers, best brands. # dis 60.55 @ 60.10 @ 70	
Second quality. # dis 70.55 @ 75	
Heiler's Horse Rasps. # dis 60.75 @ 60.10	
McAffrey's Horse Rasps. # dis 60.10	
Imported.	
J. & Riley Carr. # List, April 1, 1883, dis 15	
J. & Riley Carr Horse Rasps. # dis 15	
Moss & Gamble. # List April 1, 1883, dis 15	
Butcher. # Butcher's list, dis 20	
Stubs. # Stubs list, dis 25 @ 30	
Turton's. # Turton's list, dis 30 @ 25	
Greaves' Horse Rasps. # American list, dis 60	

Fin in Machines.	
Knox, 4 1/2-inch Rolls.....	\$3.25 each (dis 25)
Knox, 6-inch Rolls.....	\$3.00 each (dis 25)
Eagle, 3 1/2-inch Roll.....	\$2.15 (dis 25)
Crown, 1 1/2 in. \$3.50; 2 in. \$4.00; 3 in. \$4.50 each, dis 25	
Crown Jewel.....	6-in. \$2.50 each, dis 25
American, 5-in. \$3; 6-in. \$3.40; 7-in. \$4.50 each, dis 25	
Domestic Fluter.....	\$1.50 each, net
Geneva Hand Fluter, White Metal.....	dos \$12, dis 25
Crown Hand Fluter, Nos. 1, 2, 3.....	\$12.50; 2, \$10.00; 3, \$8.00
Shepard Hand Fluter, No. 25.....	dos \$12.50, dis 40
Shepard Hand Fluter, No. 110.....	dos \$11, dis 40
Shepard Hand Fluter, No. 95.....	dos \$5, dis 40
Clark's Hand Fluter.....	dos \$12.00, dis 25
Combined Fluter and Sad Iron.....	dos \$12.00, dis 25
Buffalo.....	dos \$10.00, dis 10
Fluting Machines.	
Fly Traps.....	dos \$1.50 @ 1.75
Paragon.....	dos \$2.00
Fodder Squeezers.....	dos \$1.50 @ 1.75
Blair's.....	dos \$1.25
Blair's, "Climax".....	dos \$1.25
Hay, Manure, &c., Phila. list.....	dis 60 @ 60.25
Plated, see Spoons.....	
Freezers, Ice Cream.	
Buffalo (Champion).....	dis 60.10 & 60.55
Shepard's Lightning.....	dis 60
White Mountain.....	dis 60
Wrist and Jelly Presses.	
Kentridge Mfg. Co.....	dis 20.10 @ 30
Henis.....	dos 40.55
P. D. & Co.....	dos \$1.50
Shepard's Queen City.....	dis 40
Fry Pans.	
High List.....	dis 75.55 @ 75.10 & 55
No. 1 2 3 4 5 6 7 8 9 10 11 12	
Low List.....	dis 70.10
No. 1 2 3 4 5 6 7 8 9 10 11 12	
W. doz. \$3.00 3.75 4.25 4.75 5.25 5.75 6.00 7.00 8.00 9.00	
Fuse.....	1000 ft.
Common Hemp Fuse, for dry ground.....	\$2.70
Common Cotton Fuse, for dry ground.....	2.75
Single Taped Fuse, for wet ground.....	4.00
Double Taped Fuse, for very wet ground.....	7.25
Triple Taped Fuse, for very wet ground.....	7.50
Small Gutta Percha Fuse, for water.....	12.00
Large Gutta Percha Fuse, for water.....	12.00
Gauges.	
Working Mortar, &c.....	dis 60.10
Wire, low list.....	dis 10.10
Wire, Wheeler, Madden & Co.....	dis 10
Wire, Morse's.....	dis 50 @ 50.55
Wire, Brown & Sharpe's.....	dis 10 @ 20
"Gimlets" Nail and Spike.....	dis 50.10 & 50.55
"Kureka" Gimlets.....	dis 40.10
"Diamond" Gimlets.....	gross \$5.00
Double Cut, Shepardson's.....	dis 40 @ 45.55
Double Cut, Ives.....	dis 60 @ 60.55
Double Cut, Douglass.....	dis 40.10
"Ree".....	gross \$12, dis 25 @ 25.55
4 1/2 in. La Page's Liquid.....	dis 25 @ 25.55
Tipton's Liquid.....	dis 25
W. N. La Page's Improved Liquid Glue.....	dis 25 @ 25.55
Glue.	
Tinner and Unenameled.....	dis 40.55 @ 40.10
Family Howe's "Kureka".....	dis 40
Family T. & C. S. "Handy".....	dis 50
Grindstones.	
Small at factory.....	per ton \$7.50 @ 9.0
Grindstone Fixtures.	
Sargent's Patent.....	dis 70.10
Reading Hardware Co.....	dis 50.10
Jack Saws.—See Saws.	
Hatters.—Covert's, Rope, 1/2 in. Jute.....	dis 50.55
Covert's, Rope, 1/2 in. Hemp.....	dis 40.55
Covert's, Rope, 1/2 in. Jute.....	dis 40.55
Covert's, Rope, 1/2 in. Hemp.....	dis 40.55
Covert's, Rope, 1/2 in. Jute.....	dis 40.55
Covert's, Rope, 1/2 in. Hemp.....	dis 40.55
Hammer.	
Handled Hammers.....	List Dec. 1, 1885, dis 25 @ 35.10
Buffalo Hammer Co.....	List Jan. 15, '87
Hammond & Son.....	dis 50 @ 50.55
Hudson & Beckley.....	10
Ata Tool Co.....	dis 40.10 @ 50
Fayette R. Plumb.....	dis 40.10 @ 50
Verre.....	dis 25
Magnetic Tack, Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	

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Pennsylvania.....	dis 40x10
No. 2.....	dis 40x10
Miller Challenge, No. 1.....	dis 40x10
Home No. 1.....	dis 40x10
Draw Out, No. 1.....	dis 40x10
Beef Shavers (Enterprise Mfg. Co.).....	dis 40x10
Chadborn's Smoked Beef Cutter.....	dis 40x10
Mining Knives.....	dis 40x10
Am. (2d quality), 7 gro, 1 blade, 77; 2 blades, 112; 3 blades, 118.....	dis 40x10
Lothrop's.....	dis 40x10
Smith's, 7 gro, Single, \$2.00; Double, \$3.....	dis 40x10
Knapp & Cowles.....	dis 40x10
Buffalo Adjustable.....	dis 40x10
Melanes Gaten.—Stebbins Pat. dis 70x70 & 71x71.....	dis 40x10
Stebbins' Genuine.....	dis 40x10
Stebbins' Tinned Ends.....	dis 40x10
Chase's Hard Metal.....	dis 40x10
Chase's.....	dis 40x10
Lincoln's Pattern.....	dis 40x10
Wood's.....	dis 40x10
Boes Nos. 1 2 3 4.....	dis 40x10
Money Drawers.—7 dos. \$18 @ \$20.....	dis 40x10
Muzzies.—Safety, 7 dos. \$3.....	dis 40x10
Nails.....	dis 40x10
Wire Nails & Brads, list July 14, '87.....	dis 40x10
Wire Nails, Standard Penny.....	dis 40x10
Nail Puller.—Turtiss Hammer.....	dis 40x10
Giant, No. 1.....	dis 40x10
Pelican.....	dis 40x10
Boes.....	dis 40x10
Nail Sets.—Square.....	dis 40x10
Round.....	dis 40x10
Cannon's Diamond Point.....	dis 40x10
Nut Crackers.....	dis 40x10
Table (Hudson & Beckley Mfg. Co.).....	dis 40x10
Blake's pattern.....	dis 40x10
Turner & Seymour Mfg. Co.....	dis 40x10
Nuts.....	dis 40x10
State, all kinds, 5 1/2 off list Jan. 1, 1888.....	dis 40x10
In lots less than 100 lb. 7 B, add 1/2, 1 B boxes add 1/2 to list.....	dis 40x10
Okum.....	dis 40x10
Government.....	dis 40x10
U. S. Navy.....	dis 40x10
Officer.—Zinc and Tin.....	dis 40x10
Bees and Copper.....	dis 40x10
Galvanic, Hammer's Improved, No. 1, \$3.00; No. 2, \$4.40.....	dis 40x10
Galvanic, Hammer's, Old Pattern, same list.....	dis 40x10
Prior's Patent or "Paragon" Zinc.....	dis 40x10
Prior's Patent or "Paragon" Brass.....	dis 40x10
Olmstead's Tin and Zinc.....	dis 40x10
Olmstead's Brass and Copper.....	dis 40x10
Broughton's Zinc.....	dis 40x10
Broughton's Brass.....	dis 40x10
Packing, Steam.....	dis 40x10
Rubber.....	dis 40x10
Standard.....	dis 40x10
Extra.....	dis 40x10
M. Y. B. & P. Co. Standard.....	dis 40x10
M. Y. B. & P. Co. Empire.....	dis 40x10
M. Y. B. & P. Co. Salamander.....	dis 40x10
Jenkins' Standard.....	dis 40x10
Miscellaneous.....	dis 40x10
American Packing.....	dis 40x10
Russia Packing.....	dis 40x10
Italian Packing.....	dis 40x10
Cotton Packing.....	dis 40x10
Fute.....	dis 40x10
Padlocks.—See Locks.....	dis 40x10
Pails.....	dis 40x10
Galvanized Iron.....	dis 40x10
Quarts.....	dis 40x10
Hill's Light Weight.....	dis 40x10
Hill's Heavy Weight.....	dis 40x10
Whiting's.....	dis 40x10
Sidney Shepard & Co.....	dis 40x10
Iron Clad.....	dis 40x10
Fire Buckets.....	dis 40x10
Buckets, see Wall Buckets.....	dis 40x10
Indurated Fibre Ware.....	dis 40x10
Star Pails, 12 qt.....	dis 40x10
Fire Stable and Milk, 14 qt.....	dis 40x10
Penelle's Faber's Carpenters.....	dis 40x10
Faber's Round Gilt.....	dis 40x10
Dixon's Lead.....	dis 40x10
Dixon's.....	dis 40x10
Worren's Carpenters.....	dis 40x10
Picks.....	dis 40x10
Railroad, 6 to 6, \$12.00; 6 to 7, \$13.00; 6 to 8, \$14.00; 6 to 9, \$15.00; 6 to 10, \$16.00; 6 to 11, \$17.00; 6 to 12, \$18.00.....	dis 40x10
Picture Nails.....	dis 40x10
Brass Head, Sargent's list.....	dis 40x10
Brass Head, Combination list.....	dis 40x10
Porcelain Head, Sargent's list.....	dis 40x10
Porcelain Head, Combination list.....	dis 40x10
Wiles' Patent.....	dis 40x10
Pinking Irons.....	dis 40x10
Pipe, Wrought Iron.—List March 23, 1887.....	dis 40x10
1 1/2 and under, Plain.....	dis 40x10
1 1/2 and under, Galvanized.....	dis 40x10
1 1/2 and over, Plain.....	dis 40x10
1 1/2 and over, Galvanized.....	dis 40x10
Boiler tubes, Iron.....	dis 40x10
Flanges and Flange Irons.....	dis 40x10
Wood Planes.....	dis 40x10
Molding.....	dis 40x10
Bench, First Quality.....	dis 40x10
Bench, Second Quality.....	dis 40x10
Bailey's (Stanley R. & L. Co.).....	dis 40x10
Iron Planes.....	dis 40x10
Bailey's (Stanley R. & L. Co.).....	dis 40x10
Miscellaneous Planes (Stanley R. & L. Co.).....	dis 40x10
Victor Planes (Stanley R. & L. Co.).....	dis 40x10
Stearns Iron Planes.....	dis 40x10
Meriden Mal. Iron Co.....	dis 40x10
Davis's Iron Planes.....	dis 40x10
Birmingham Plane Co.....	dis 40x10
Gage Tool Co.'s Self-Setting.....	dis 40x10
Chaplin's Iron Planes.....	dis 40x10
Plane Irons.....	dis 40x10
Plane Irons, Butcher's.....	dis 40x10
Plane Irons, Buck Bros.....	dis 40x10
Plane Irons, Auburn Tool Co. "Thistle".....	dis 40x10
Plane Irons, Middlesex Mfg. Co., "Baldwin Iron," Single and Cut.....	dis 40x10
Double.....	dis 40x10
L & J. White.....	dis 40x10
Planes and Nippers.....	dis 40x10
Button's Patent.....	dis 40x10
Butt's Pat. Compound Lever Cutting Nippers, No. 7.....	dis 40x10
6 in. \$13.50; No. 4, 7 in. \$21.00; 7 dos dis 40x10.....	dis 40x10
Hudson & Beckley Mfg. Co.....	dis 40x10

Gas Pliers.....	dis 40x10
Gas Pliers, Custer's Nickel Plated.....	dis 40x10
Eureka Pliers and Nippers.....	dis 40x10
Russell's Parallel.....	dis 40x10
P. S. & W. Cast Steel.....	dis 40x10
P. S. & W. Timmers' Cutting Nippers.....	dis 40x10
Carew's Pat. Wire Cutters.....	dis 40x10
Morrill's Parallel, per doz. \$12.....	dis 40x10
Eureka's 8 in. \$15; 10 in. \$21.....	dis 40x10
Flanges and Levels.....	dis 40x10
Regular List.....	dis 40x10
Diston's.....	dis 40x10
Pocket Levels.....	dis 40x10
Davis Iron Levels.....	dis 40x10
Davis' Inclination.....	dis 40x10
Peppers, Corn.....	dis 40x10
Round or Square, 1 qt.....	dis 40x10
Round or Square, 2 qt.....	dis 40x10
Post Hole and Tree Augers and Diggers.....	dis 40x10
Samson Post Hole Digger.....	dis 40x10
Fletcher Post Hole Augers.....	dis 40x10
Eureka Diggers.....	dis 40x10
Lead's.....	dis 40x10
Vannan's Post Hole Auger, per doz. \$13.00 @ \$14.00.....	dis 40x10
Kohler's Little Giant.....	dis 40x10
Kohler's Hercules.....	dis 40x10
Kohler's New Champion.....	dis 40x10
Schneider.....	dis 40x10
Ryan's Post Hole Diggers.....	dis 40x10
Empire Post Hole.....	dis 40x10
Gibb's Post Hole Digger, 7 dos \$30.....	dis 40x10
Pointe Parers.....	dis 40x10
White Mountain.....	dis 40x10
Antrim Combination.....	dis 40x10
Hoosier.....	dis 40x10
Pruning Hooks and Shears.....	dis 40x10
Diston's Combined Pruning Hook and Saw.....	dis 40x10
Spring.....	dis 40x10
Diston's Pruning Hook.....	dis 40x10
E. S. Lee & Co.'s Pruning Tools.....	dis 40x10
Pruning Shears, Henry's Pat.....	dis 40x10
Henry's Pruning Shears.....	dis 40x10
Wheeler, M. & Co.'s Combination.....	dis 40x10
Dunlap's Saw and Chisel.....	dis 40x10
J. Mallinson & Co.....	dis 40x10
Pushers.—Hot House, Awnings, etc.....	dis 40x10
Japanned Screw.....	dis 40x10
Brass Screw.....	dis 40x10
Japanned Side.....	dis 40x10
Japanned Clothes Line.....	dis 40x10
Empire Sash Pulley.....	dis 40x10
Moore's Sash, Anti Friction.....	dis 40x10
Hay Fork, Solid Eye, \$4.00; Swivel, \$4.50.....	dis 40x10
Hay Fork, "Anti Friction," 5 in. Solid, \$4.70.....	dis 40x10
Hay Fork, "P" Common and Pat. Bushed.....	dis 40x10
Hay Fork, Tarbox Pat. Iron.....	dis 40x10
Hay Fork, Reed's Self-Lubricating.....	dis 40x10
Shade.....	dis 40x10
Tackle Blocks.....	dis 40x10
Pumps.—Clatern, Best Makers.....	dis 40x10
Pitcher Spout, Best Makers.....	dis 40x10
Pitcher Spout, Cheaper Goods.....	dis 40x10
Punches.....	dis 40x10
Saddlers' or Drive, good quality.....	dis 40x10
Bemis & Call Co.'s Cast Steel Drive.....	dis 40x10
Bemis & Call Co.'s Springfield Socket.....	dis 40x10
Spring, good quality.....	dis 40x10
Spring, Leech's Patent.....	dis 40x10
Bemis & Call Co.'s Spring and Check.....	dis 40x10
Solid Timmers.....	dis 40x10
Timmers' Hollow Punches.....	dis 40x10
Rice Hand Punches.....	dis 40x10
Roll.....	dis 40x10
Sliding Door, Wrt. Brass.....	dis 40x10
Sliding Door, Bronzed Wrt. Iron.....	dis 40x10
Sliding Door Iron, Painted.....	dis 40x10
Sliding Door, Light.....	dis 40x10
Per 100 feet.....	dis 40x10
For N & Hangers.....	dis 40x10
Small.....	dis 40x10
Med.....	dis 40x10
Large.....	dis 40x10
Per 100 feet.....	dis 40x10
Terry's Wrought Iron.....	dis 40x10
Victor, Track Rail, 7 1/2 foot.....	dis 40x10
Carrier Steel Rail, per foot.....	dis 40x10
Ha. co.....	dis 40x10
Cast tool.....	dis 40x10
Wall, able.....	dis 40x10
Gibbs Lawn Rake.....	dis 40x10
Canton Lawn Rake.....	dis 40x10
St. Madison Prize Box, Brass and Peerside.....	dis 40x10
Port Madison Steel Tooth Lawn Rake, \$6.....	dis 40x10
Razors.—J. R. Torrey Razor Co.....	dis 40x10
Wostenholme and Butcher.....	dis 40x10
Razor Mopras.....	dis 40x10
Genuine Emerson.....	dis 40x10
Imitation Emerson.....	dis 40x10
Torrey's.....	dis 40x10
Badger's Belt and Combination.....	dis 40x10
Lamont Combination.....	dis 40x10
Stoves and Barres.....	dis 40x10
Iron, list November 17, 1887.....	dis 40x10
Rivet Sets.....	dis 40x10
Rods.—Stair, brass.....	dis 40x10
Stair Black Walnut.....	dis 40x10
Rollers.....	dis 40x10
Ball's Sargent's list.....	dis 40x10
Acme (Anti-Friction).....	dis 40x10
Union Barn Door Roller.....	dis 40x10
Rope.—Manufacturers' prices for large lots.....	dis 40x10
Manila.....	dis 40x10
Manila.....	dis 40x10
Manila.....	dis 40x10
Manila Tarred Rope.....	dis 40x10
Manila, Hay Rope.....	dis 40x10
Sisal.....	dis 40x10
Sisal.....	dis 40x10
Sisal Hay Rope.....	dis 40x10
Sisal Tarred Rope.....	dis 40x10
Sisal Medium Lath Yarn.....	dis 40x10
Onton Rope.....	dis 40x10
Jute Rope.....	dis 40x10
Ropes.....	dis 40x10
Boxwood.....	dis 40x10
Ivory.....	dis 40x10
Sad Irons.....	dis 40x10
From 1 to 10, at factory.....	dis 40x10
Self-Heating Tailors.....	dis 40x10
Gleason's Shield and Toilet.....	dis 40x10
Mrs. Pott's Irons.....	dis 40x10
Enterprise Star Irons, new list, July 30, 1888.....	dis 40x10
Combined Fluter and Sad Iron.....	dis 40x10
Fox Reversible, Self-Fluter.....	dis 40x10
Chinese Laundry (N. E. Butt Co.).....	dis 40x10
New Zealand.....	dis 40x10
Mahony's Troy Pot Irons.....	dis 40x10
Sand and Emery Paper and Cloth.....	dis 40x10
List April 19, 1886.....	dis 40x10
Sibley's Emery and Crocus Cloth.....	dis 40x10
Sash Cord.....	dis 40x10
Common.....	dis 40x10
Patent, good quality.....	dis 40x10
White Cotton Braided, fair quality.....	dis 40x10
Common Penna Sash.....	dis 40x10

Patent Cable Laid Italian " " " "	dis 22 1/2 @ 135
India Cable Laid " " " "	dis 22 1/2 @ 135
Silver Lake, A Quality, White.....	50c. dis 10410425
Silver Lake, A Quality, Drab.....	55c. dis 10410425
Silver Lake, B Quality, White.....	50c. dis 10410425
Silver Lake, B Quality, Drab.....	55c. dis 10410425
Silver Lake, C Quality, White (only).....	57 1/2 @ 385
Sylvan Springs, Extra Braided, White.....	30c
Sylvan Springs, Extra Braided, Drab.....	30c
Semper Idem, Braided, White.....	30c
Egyptian, India Hemp, Braided.....	32c
Samson, Braided, White Cotton.....	50c dis 30 @ 30425
Samson, Braided, Drab Cotton.....	55c dis 30 @ 30425
Samson, Braided Italian Hemp.....	55c dis 30 @ 30425
Samson Braided Linen.....	50c dis 30 @ 30425
Sash Locks.	
Clark's No. 1, \$10.00; No. 2, \$8.00 7 gross.....	dis 32 1/2
Ferguson's.....	dis 32 1/2
Morris and Triumph, list Aug. 16, 1886.....	dis 32 1/2
Victor.....	50c10425
Walker's.....	dis 10 1/2
Attwell Mfg. Co.....	dis 25 @ 32 1/2
Reading.....	dis 60 1/2 @ 10410
Hammond's Window Springs.....	dis 40
Common Sense, Jap. d. Cop'd and Brased.....	7 gross 14
Common Sense, Nickel Plated.....	7 gross 10 1/2
Universal.....	dis 30
Kempshall's Gravity.....	dis 60 1/2
Kempshall's Model.....	dis 60 @ 60410
Corbin's Daisy, list February 15, 1886.....	dis 70 1/2
Pavson's Perfect.....	dis 60 @ 60410
Huganin's New and Improved Adjustable Sash Locks, list Jan. 5, 1887.....	dis 52 1/2
Huganin's New Sash Locks, list Jan. 5, '87, dis 52 1/2 @ 10410	dis 10 1/2
Stoddard " Practical ".....	dis 10 1/2
Ivory Patent.....	dis 60 1/2
Leesche's No. 100 & 110, 7 gro. \$5; 105, \$10, dis 30410	dis 10 1/2
Davis, Bronze, Barnes Mfg. Co.....	dis 50
Champion Safety, list March 1, 1888.....	dis 55 @ 52 1/2
Security.....	dis 70 1/2
Sash Weights.	
Solid Eyes.....	7 ton 32
Sawage Stuffers or Fillers.	
Miller's "Challenge".....	7 dos. 120, dis 50 @ 50425
Perry.....	7 dos. No. 1, \$15; No. 2, \$11, dis 50 @ 50425
Draw Cut No. 4.....	each, \$30.00, dis 30
Enterprise Mfg. Co.....	dis 50410 @ 30 1/2
Atkins.....	dis 40410 1/2
Saws.	
Diston's Circular.....	dis 45 @ 4525 1/2
Diston's Cross Cuts, dis 45 @ 4525 1/2	Extra 5 some times given by Diston's Hand.....
Atkins' Circular.....	dis 50 1/2
Atkins' Silver Steel Diamond X Cuts.....	7 foot 70 1/2
Atkins' Special Steel Dexter X Cuts.....	7 foot 60 1/2
Atkins' Special Steel Diamond X Cuts.....	7 foot 27 1/2
Atkins' Champion and Electric Tooth X Cuts.....	7 foot 27 @ 254
Atkins' Hollow Back X Cuts.....	7 foot 14 1/2
Atkins' Shingle, Mulay, Drag, &c.....	dis 45 1/2
W. M. & C. Hand.....	dis 30425 @ 30410 1/2
W. M. & C. Champion X Cuts, Regular.....	7 foot 34 @ 25 1/2
W. M. & C. X Cuts, Thin Back.....	7 foot 27 1/2
Peace Circular and Mill.....	dis 45410 1/2
Peace Hand Panel and Rip.....	dis 30410 @ 30410 1/2
Peace Cross Cuts, Standard.....	7 foot 254
Peace Cross Cuts, Thin Back.....	7 foot 27 1/2
Richardson's Circular and Mill.....	dis 45 @ 45410 1/2
Richardson's X-Cuts, No. 1, 2nd; No. 2, 3rd; No. 3, 4th.....	dis 40410 @ 50 1/2
Griffin's Hack Saws, complete.....	dis 40410 @ 50 1/2
Griffin's Hack Saw, Blades only.....	dis 40410 @ 50 1/2
Star Hack Saws and Blades.....	dis 25 1/2
Diamond Hack Saws and Blades.....	dis 25 1/2
Eureka and Crescent.....	dis 25 1/2
Saw Frames.	
White Vermont.....	7 gro 50 @ 10410
Red, Polished, and Varnished.....	7 dos \$1.50, dis 25 1/2
Saw Sets.	
Stillman's Genuine.....	7 dos \$6.00 and \$7.75, dis 40425
Stillman's Imita.....	7 dos \$3.25 and \$5.25, dis 40425 @ 10410
Common Lever.....	7 dos \$6.00, dis 40425
Morrill's No. 1, \$15.00; No. 2 & 4, \$12.....	dis 40410 @ 50410
Leach's.....	No. 0, \$3.00; No. 1, \$15.00, dis 15 @ 30 1/2
Nash's.....	dis 30410 @ 30410 1/2
Hammer, Hotchkiss.....	dis 35, dis 10 1/2
Bemis & Call Co.'s new Patent.....	dis 30425
Bemis & Call Co.'s Lever and Spring Hammer.....	dis 30425
Bemis & Call Co.'s Plate.....	dis 10 1/2
Bemis & Call Co.'s Cross Cut.....	dis 19 1/2
Alken's Genuine.....	\$15.00, dis 50410 1/2
Alken's Imitation.....	7 foot, dis 50425
Hart's Patent Lever.....	dis 35, dis 10 1/2
Diston's Star, No. 15, \$5.50, dis 40410 @ 30410 1/2	dis 30425
Atkins' Lever.....	per dos No. 1, \$9.00; No. 2, \$7.50
Atkins' Criterion.....	per dos \$9.00
Croissant & Keller, No. 1, \$15.00; No. 2, \$12.00, dis 33 1/2 @ 10410	
Saw Teets.	
Atkins Perfection.....	\$15.00; Excelsior \$6.00 7 dos
Scales.	
Hatch, Counter, No. 171, good quality.....	7 dos 30
Hatch, Tea, No. 161.....	7 dos \$6.75 @ \$7.00
Union Platform, Plain.....	\$2.10 @ 2.30
Union Platform, Striped.....	\$2.30 @ 2.50
Chattillon's Grocers' Trip Scales.....	dis 40 1/2
Sargent & Co.'s No. 40.....	dis 25 1/2
Chattillon's Favorite.....	dis 40 1/2
Family, Turnbull's.....	dis 30 @ 30410
Scale Beams.	
Scale Beams, list of Jan. 12, 88, dis 50410 @ 50410 1/2	
Chattillon's No. 1.....	dis 49 1/2
Chattillon's No. 2.....	dis 50 1/2
Scrapers.	
Adjustable Box Scraper (R. & L. Co.).....	\$3.50, dis 30410 1/2
Box, 1 Handle.....	7 dos 10 1/2
Box, 2 Handle.....	7 dos \$6.00, dis 10 1/2
Defiance Box and Ship.....	dis 30410 1/2
Foot.....	dis 50410 @ 50 1/2
Ship, Common.....	7 dos \$3.50 net
Ship, Providence Tool Co.....	dis 10 1/2
Screen Window and Door Frames.	
Porter's Pat. Window and Door Frame.....	dis 22 1/2 @ 10410
Screen Corner Irons, Warner's.....	dis 33 1/2 @ 33 1/2 @ 10410
Stearns' Frames and Corners.....	dis 35 @ 35410 1/2
Screw Drivers.	
Douglas Mfg. Co.....	dis 30410 @ 10410 1/2
Diston's.....	dis 45410 1/2
Diston's Patent Excelsior.....	dis 45410 1/2
Burns.....	dis 30 1/2
Stanley R. & L. Co.'s Varnished Handles.....	dis 50410 1/2
Stanley R. & L. Co.'s Black Handles.....	dis 10410 1/2
Sargent & Co.'s No. 1 Forged Blade.....	dis 7 1/2 @ 10410 1/2
Sargent & Co.'s No. 40.....	dis 60 1/2 @ 10410 1/2
Sargent & Co.'s No. 60, Cast Steel.....	dis 60410 1/2
Sargent & Co.'s No. 60, Round Blade.....	dis 7 1/2 @ 10410 1/2
Knapp & Cowles' No. 1 Extra.....	dis 60 @ 50410 1/2
Knapp & Cowles' No. 1 Extra.....	dis 60 @ 50410 1/2
Knapp & Cowles' No. 60 & t.....	dis 50425 @ 50410 1/2
Stearns'.....	dis 25410 1/2
Gay & Parsons.....	dis 25 1/2
Champion.....	dis 25 1/2
Clark's Patent.....	dis 30 @ 32 1/2
Crawford's Adjustable.....	dis 30 @ 32 1/2
Clark's Pocket and Latchet.....	dis 25 @ 35410 1/2
Allard's Spiral, new list.....	dis 25 1/2
Kolb's Common Sense.....	7 dos \$6, dis 25410 1/2

Syracuse Screw-Drivers Bts.	dis 30 & 30.25
Screw Driver Bts.	dis 50 & 75
Screw Driver Bts. Parr's	dis 50 & 75
Pray's Hol. Adle. Sets, No. 3, 11.2	dis 25 & 25 & 10
P. D. & Co.'s, all Steel.	dis 50
Screws	
Wood Screws—List, Brass, Jan. 27; Iron, July 1, 1887	
Flat Head Iron.	dis 70
Round Head Iron.	dis 65
Flat Head Brass.	dis 65
Round Head Brass.	dis 60
Flat Head Bronze.	dis 65
Round Head Bronze.	dis 60
Nails	
Flat Head, Iron.	dis 55
Round Head, Iron.	dis 50
Beach and Head	
Beach, Iron.	dis 55 & 10 & 55 & 10 & 10
Beach, Wood, Beach.	dis 25 & 10 & 25 & 10 & 25
Beach, Wood, Hickory.	dis 25 & 10 & 25 & 10 & 25
Hand, Wood.	dis 25 & 10 & 25 & 10 & 25
Las, Blunt Point.	dis 75 & 75 & 10
Coach and Lag, Blunt Point.	dis 75 & 75 & 10
Bed.	dis 25 & 10 & 25 & 10 & 25
Hand Rail, Sargent's.	dis 60 & 10 & 25 & 10 & 25
Hand Rail, Humason, Beckley & Co.'s.	dis 70 & 10 & 25 & 10 & 25
Hand Rail, Am. Screw Co.	dis 75 & 10
Jack Screws, Millers Falls list.	dis 50 & 50 & 10
Jack Screws, P. S. & W.	dis 35 & 10
Jack Screws, Sargent.	dis 60 & 10 & 60 & 10 & 60
Jack Screws, Stearns.	dis 40 & 40 & 10
Correll Saw.	
Lester, complete, \$10.00.	dis 25 & 10
Rogers, complete, \$4.00.	dis 25 & 10
Scythe Sheaths.	dis 60 & 10
Shears	
American (Cast) Iron.	dis 75 & 10 & 75 & 10 & 10
Pruning. See Pruning Hooks and Shears	
Barber's Lamp Trimmers.	dis 30 & 35
Tinners.	dis 20 & 25
Leymour's, List, Dec. 1881 dis 60 & 10 & 10 & 10 & 10	
Heinrich's, List, Dec. 1881 dis 60 & 10 & 10 & 10 & 10	
Heinrich's Tailor's Shears.	dis 35 & 10
First quality, C. S. Trimmer.	dis 60 & 10 & 60 & 10 & 10
Second quality, C. S. Trimmer.	dis 60 & 10 & 60 & 10 & 10
Acme Cast Shears.	dis 10 & 10 & 10
Diamond Cast Shears.	dis 10 & 10 & 10
Clippers.	dis 10 & 10 & 10
Victor Cast Shears.	dis 75 & 10 & 75 & 10 & 10
Hove Bros. & Hulbert, Solid Forged Steel.	dis 40 & 10
Cleveland Machine Co., Solid Steel Forged.	dis 70 & 10
Claude Shear Co., Japanned.	dis 70 & 10
Claude Shear Co., Nickel, same list.	dis 60 & 10
Sliding Door	
M. W. & Co., list July, 1888.	dis 60 & 10 & 60 & 10 & 10
R. & E. list Dec. 18, 1885.	dis 55 & 10
Corbin's list.	dis 60 & 10 & 60 & 10 & 10
Patent Roller, Harfield's.	dis 75 & 10
Russell's Anti-Friction, list Dec. 18, 1885.	dis 60 & 10
Moore's Anti-Friction.	dis 60 & 10
Sliding Saw	
R. & E. list Dec. 18, 1885.	dis 60 & 10 & 60 & 10 & 10
Sargent's list.	dis 60 & 10 & 60 & 10 & 10
Reading list.	dis 60 & 10 & 60 & 10 & 10
Ship Tools	
L. & J. White.	dis 25 & 10
Albertson Mfr. Co.	dis 25 & 10
Sheets, Morse, Mule, & Co.	
Horse	
Burden's, Perkins, Phoenix, at factory.	\$4.00
Make—At 1 Reg to above prices.	
Co. Freight	
100 tons.	dis 25 & 10
1000 tons.	dis 25 & 10
500 tons.	dis 25 & 10
Shot.—(Eastern prices, 25 off. cash, 5 days.)	
Drop, 4 bag, 25	\$1.50
Drop, 4 bag, 25	\$1.50
Buck and Chilled, 25 bag	\$1.55
Buck and Chilled, 25 bag	\$1.55
Shovels and Spades.	
Ames' Shovels, Spades, & Co., list Nov. 1, 1885.	dis 20 & 10
Notz.—Jobbers frequently give 5 & 7 1/2 % extra on above.	
Gilth's Black Iron.	dis 50 & 10 & 50 & 10 & 10
Gilth's O. S.	dis 60 & 10 & 60 & 10 & 10
Gilth's Solid Cast Steel R. R. Goods.	dis 20 & 10
Old Colony (Sanford Fork & Tool Co.).	dis 20 & 10
St. Louis Shovel Co.	dis 20 & 10 & 20 & 10 & 10
Hussey, Bliss & Co.	dis 15 & 25 & 10
Hubbard & Co.	dis 20 & 10 & 20 & 10 & 10
Lehigh Mfg. Co.	dis 60 & 10 & 60 & 10 & 10
Payne Peterson & Son, list January, 1886.	dis 30 & 10
Remington's (Lowman's Patent).	dis 30 & 10 & 40 & 10
Rowland's, Black Iron.	dis 50 & 10 & 50 & 10 & 10
Rowland's Steel.	dis 60 & 10 & 60 & 10 & 10
Shovels and Tongs	
Iron Head.	dis 60 & 10 & 60 & 10 & 10
Brass Head.	dis 60 & 10 & 60 & 10 & 10
Skreens	
Western list.	dis 75 & 10 & 75 & 10 & 10
Columbus Wrt. Steel, list Nov. 1, 1887.	dis 20 & 10
Coldbrookdale Iron Co.	dis 5 & 10 & 10
Utica P. S. T. Skreens.	dis 60 & 10
Utica Turned and Fitted.	dis 35 & 10
Slaves	
Buffalo Metallic, R. S. & Co., new list.	dis 50 & 25 & 10 & 10
Barber Flour Sift.	dis 25 & 10
Smith's Adjustable Sifters.	dis 25 & 10
Smith's Adjustable Milk Strainer.	dis 25 & 10
Smith's Adjustable F. & C. Strainer.	dis 17.75
Shops, Wooden Mm.	dis 70 & 10
Mesh 18, Nested, 4 doz.	dis 70 & 10
Mesh 20, Nested, 4 doz.	dis 70 & 10
Mesh 24, Nested, 4 doz.	dis 70 & 10
Shops, Wooden Mm.	dis 70 & 10
Anchor H. & S. Mfg. Co.	dis 60 & 10
Fitch's (Bristol).	dis 60 & 10
Hotchkiss.	dis 10 & 10
Andrews.	dis 10 & 10
Sargent's Patent Guarded.	dis 70 & 10 & 10 & 10 & 10
German, new list.	dis 40 & 10 & 40 & 10 & 10
Covert.	dis 60 & 10 & 60 & 10 & 10
Covert, New Patent.	dis 60 & 10 & 60 & 10 & 10
Covert New R. E.	dis 60 & 10 & 60 & 10 & 10
Covert Spring.	dis 60 & 10 & 60 & 10 & 10
Soldering Irons	
Covert's Adjustable, list Jan. 1, 1886.	dis 35 & 10
Spoke Shaves.—Iron.	dis 30 & 10
Wood.	dis 30 & 10
Bailey's (Stanley R. & L. Co.).	dis 40 & 10 & 40 & 10 & 10
Stearns.	dis 30 & 10 & 30 & 10 & 10
Spoke Trimmers.	dis 10.00, dis 50 & 10
Stearns.	dis 20 & 10 & 20 & 10 & 10
Ives.	No. 1, \$15.00; No. 2, \$12.00; dis 20 & 10
Donahue.	dis 20.00, dis 30 & 10
Spoons and Forks	
Tinned Iron	
Basting, Central Stamping Co.'s list.	dis 70 & 70 & 10 & 10
Solid Table and Tea, Central Stamping Company's list.	dis 70 & 70 & 10 & 10
Refined, R. S. & Co.	dis 35 & 10
Wire Plated—4 mos. or 5 cash 31 days.	
Meriden Brit. Co., Rogers.	dis 50 & 10
C. Rogers & Bros.	dis 50 & 10
Rogers & Bro.	dis 50 & 10
Wm. Rogers Mfg. Co.	dis 50 & 10 & 50 & 10 & 10
Wm. Rogers Mfg. Co.	dis 50 & 10 & 50 & 10 & 10
Edwards & Edwards Silver Co.	dis 50 & 10 & 50 & 10 & 10

H. & E. Silver Co. Mexican Silver.	dis 60 & 10
H. & E. Silver Co. Durham Silver.	dis 50 & 10
German Silver.	dis 50 & 10
German Silver, Hall & Elton.	dis 50 & 10
Nickel Silver.	dis 50 & 10
Boardman's Flat Ware.	dis 50 & 10
Boardman's Nickel Silver.	dis 50 & 10
Boardman's Britannia Spoons, case lots.	dis 60 & 10
Springs	
Elliptic, Concord, Platform and Half Scroll.	dis 60 & 60 & 10
Cliff's Bolster Springs.	dis 25 & 10
Squares	
Steel and Iron.	dis 75 & 75 & 10 & 10
Nickel Plated.	dis 75 & 75 & 10 & 10
Try Square and T Bevels.	dis 60 & 10 & 10 & 70
Diastion's Try Square and T Bevels.	dis 45 & 10
Winterbottom's Try and Miter.	dis 30 & 10
Staples	
Fence Staples, Galvanized } Same price as Barb Wire.	
Fence Staples, Plain }	
See Trade Report.	
Staples.	dis 40 & 10 & 40 & 10 & 10
Staples and Dies	
Blacksmith's, Waterford Goods.	dis 30 & 10 & 30 & 10 & 10
Lightning Screw Plate.	dis 25 & 30
Reece's New Screw Plates.	dis 33 & 10 & 33 & 10 & 10
Staples	
Hind Stone, No. 1, 3; Axe, 5; Slips No. 1, 5.	
Washita Stone, Extra.	dis 25 & 10 & 25 & 10 & 10
Washita Stone, No. 1.	dis 15 & 10 & 15 & 10 & 10
Washita Stone, No. 2.	dis 11 & 10 & 11 & 10 & 10
Washita Slips, No. 1, Extra.	dis 40 & 10 & 40 & 10 & 10
Washita Slips, No. 1.	dis 40 & 10 & 40 & 10 & 10
Arkansas Stone, No. 1, 4 to 8 in.	dis 11 & 10 & 11 & 10 & 10
Arkansas Stone, No. 1, 6 to 9 in.	dis 11 & 10 & 11 & 10 & 10
Turkey Oil Stone.	dis 4 to 8 in.
Turkey Slips.	dis 1.00 & 1.50
Lake Superior, Chase.	dis 1.10
Lake Superior Slips, Chase.	dis 1.10
Seneca Stone, Red Paper Brand.	dis 1.10
Seneca Stone, High Rounds.	dis 2.00
Seneca Stone, Small White.	dis 2.00
Stove Polish	
Joseph Dixon's.	dis 10 & 10
Gem.	dis 10 & 10
Gold Medal.	dis 10 & 10
Mirror.	dis 10 & 10
Lauro.	dis 10 & 10
Ruby.	dis 10 & 10
Rising Sun, 5 gro. lots.	dis 10 & 10
Dixon's Plumbago.	dis 10 & 10
Boydton's Noon Day.	dis 10 & 10
Parlor Pride Stove Enamel.	dis 10 & 10
Yates' Liquid.	dis 10 & 10
Yates' Standard Paste Polish 10-lb cans.	dis 10 & 10
Jet Black.	dis 10 & 10
Japanese.	dis 10 & 10
Flint.	dis 10 & 10
Diamond O. K. Kneal.	dis 10 & 10
Tacks, Brads, & Co.	
Am. Iron (Carpet) Tacks.	dis 75 & 10 & 75 & 10 & 10
Steel Carpet Tacks.	dis 75 & 10 & 75 & 10 & 10
Swedes Iron Carpet Tacks.	dis 75 & 10 & 75 & 10 & 10
American Iron Cut Tacks.	dis 75 & 10 & 75 & 10 & 10
Swedes Iron Tacks.	dis 75 & 10 & 75 & 10 & 10
Swedes Iron Upholsterers' Tacks.	dis 75 & 10 & 75 & 10 & 10
Tinned Swedes Iron Tacks.	dis 75 & 10 & 75 & 10 & 10
Tinned Swedes Iron Upholsterers' Tacks.	dis 75 & 10 & 75 & 10 & 10
Swedes Iron Tacks.	dis 75 & 10 & 75 & 10 & 10
Tinned Gimp and Lace Tacks.	dis 75 & 10 & 75 & 10 & 10
Swedes Iron Trimmers' Tacks.	dis 75 & 10 & 75 & 10 & 10
Swedes Iron Miners' Tacks.	dis 75 & 10 & 75 & 10 & 10
Swedes Iron Bill Posters' or Railroad Tacks.	dis 75 & 10 & 75 & 10 & 10
Swedes Steel Tacks, all kinds (Swedes Iron price list).	dis 75 & 10 & 75 & 10 & 10
Copper Tacks.	dis 75 & 10 & 75 & 10 & 10
Copper Finishing Trunk and Clout Nails.	dis 75 & 10 & 75 & 10 & 10
Finishing Nails.	dis 75 & 10 & 75 & 10 & 10
Trunk and Clout Nails.	dis 75 & 10 & 75 & 10 & 10
Tinned Trunk and Clout Nails.	dis 75 & 10 & 75 & 10 & 10
Black Nail.	dis 75 & 10 & 75 & 10 & 10
Common and Patent Brads.	dis 75 & 10 & 75 & 10 & 10
Hungarian Nails.	dis 75 & 10 & 75 & 10 & 10
Chair Nails.	dis 75 & 10 & 75 & 10 & 10
Zinc Glaziers' Points.	dis 75 & 10 & 75 & 10 & 10
Clear Box Nail.	dis 75 & 10 & 75 & 10 & 10
Picture Frame Points.	dis 75 & 10 & 75 & 10 & 10
Looking Glass Tacks.	dis 75 & 10 & 75 & 10 & 10
Leathered Carpet Tacks.	dis 75 & 10 & 75 & 10 & 10
Brush Tacks.	dis 75 & 10 & 75 & 10 & 10
Shoe Finders.	dis 75 & 10 & 75 & 10 & 10
Lining and Saddle Nails, list Jan. 1, 1886.	
Silvered.	dis 30 & 10 & 30 & 10 & 10
Japanned.	dis 30 & 10 & 30 & 10 & 10
Double-pointed Tacks.	dis 30 & 10 & 30 & 10 & 10
Wire Brads and Nails.	dis 30 & 10 & 30 & 10 & 10
Wire Steel Brads, R. & E. Mfg. Co.'s list.	dis 30 & 10 & 30 & 10 & 10
Tap Borers.—Common and R. E.	
Ives' Tap Borers.	dis 30 & 10 & 30 & 10 & 10
Enterprise Mfg. Co.	dis 30 & 10 & 30 & 10 & 10
Clair.	dis 30 & 10 & 30 & 10 & 10
Tapers, Measuring.—American.	
Springs.	dis 30 & 10 & 30 & 10 & 10
Thermometers.—Tin Case.	dis 30 & 10 & 30 & 10 & 10
Thimble Skreens.—See Skreens.	
Ties, Bale.	
Steel Wire, Standard list.	dis 30 & 10 & 30 & 10 & 10
Tinners' Shears, & Co.	
Shears and Snips (P. S. & W.).	dis 20 & 10
Punches.—See Punches.	
Snips, J. Mallinson & Co.	dis 33 & 10
Tinware	
Stamped, Japanned & Piced, list Jan. 20, 1886.	dis 70 & 10 & 70 & 10 & 10
Tire Benders, Upsetters, & Co.	
Stoddard's Lightning Tire Upsetters.	dis 15 & 10
Detroit Perfect Tire Bender.	dis 15 & 10
Tobacco Cutters	
Enterprise Mfg. Co. (Champion).	dis 20 & 10 & 20 & 10 & 10
Wood Bottom.	dis 20 & 10 & 20 & 10 & 10
All Iron.	dis 20 & 10 & 20 & 10 & 10
Nashua Lock Co.'s.	dis 20 & 10 & 20 & 10 & 10
Wilson's.	dis 20 & 10 & 20 & 10 & 10
Clippers (Sargent & Co.).	dis 20 & 10 & 20 & 10 & 10
Acme.	dis 20 & 10 & 20 & 10 & 10
Transom Lifter	
Wollensak's Patent Iron Bronzed.	dis 50 & 10
Rehler's bronzed Iron Rods list Jan. 1, 1887, dis 50 & 10	
Rehler's Real Bronze or Nickel Plate, list Jan. 1, 1887.	dis 50 & 10
Excelsior.	dis 50 & 10
Shaw.	dis 50 & 10
Payson's Universal.	dis 40 & 10 & 40 & 10 & 10
Crown and Star.	dis 50 & 10
Traps	
Newhouse.	dis 75 & 10 & 75 & 10 & 10
Onion pattern.	dis 70 & 10 & 70 & 10 & 10
Gambel's Black Cat.	dis 40 & 10 & 40 & 10 & 10
Mice and Rat	
Mouse, Wood Choker.	dis 10 & 10
Mouse, Round Wire.	dis 10 & 10
Mouse, Cage, Wire.	dis 10 & 10
Mouse, Catch-em-alive.	dis 10 & 10
Mouse, Bonanza.	dis 10 & 10
Mouse, Delusion.	dis 10 & 10

Rat, "Decoy".	dis 10.00, dis 10 & 10
Ideal.	dis 10.00, dis 10 & 10
Cyclone.	dis 10.00, dis 10 & 10
Hotchkiss Metallic Mouse, 5-hole traps.	dis 10.00, dis 10 & 10
In full cases.	dis 10.00, dis 10 & 10
Trowels	
Lothrop's Brick and Plastering.	dis 25 & 10
Reed's Brick and Plastering.	dis 25 & 10
Diastion's Brick and Plastering.	dis 25 & 10
Peace's Plastering.	dis 25 & 10
Clement & Maynard's.	dis 25 & 10
Rose's Brick.	dis 25 & 10
Brace's Brick.	dis 25 & 10
Worral's Brick and Plastering.	dis 25 & 10
Garden.	dis 25 & 10
Triers.—Butter and Cheese.	
Trucks, Warehouse, & Co.	dis 25 & 10
H. & L. Block Co.'s list, 1883.	dis 25 & 10
Twines	
No. 1, Flax Twine, 4 and 5 Balls.	dis 25 & 10

CURRENT METAL PRICES.

AUGUST 29, 1888.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market reports.

IRON AND STEEL.

Bar Iron from Store.

Common Iron:	
1 to 2 in. round and square...	1.90 @ 2.00¢
2 to 3 in. x 1/2 to 1 in.	
Refined Iron:	
1 to 2 in. round and square...	2.10 @ 2.25¢
2 to 3 in. x 1/2 to 1 in.	
1 to 2 in. x 1/2 and 5-16	2.30 @ 2.45¢
Rods—1/2 and 11-16 round and sq.	2.30 @ 2.35¢
Bands—1 to 6 x 3-16 to No. 12	2.30 @ 2.45¢
"Burden Best" Iron, base price.	3.00 @
Burden's "H. B. & S." Iron, base price.	2.80 @
"Ulster"	3.10 @
Norway Rods	4.00 @ 5.00¢

Merchant Steel from Store.

Open-Hearth and Bessemer Machinery,	
Toe Calk, Tire and Sleigh Shoe, base price in small lots	2.4¢ @ 3¢
Best Cast Steel, base price in small lots	3.4¢ @ 3¢
Best Cast Steel Machinery, base price in small lots	5.4¢ @ 6¢
For Classification and Extras adopted by the Merchant Steel Association of the United States, June 1, 1888, see <i>The Iron Age</i> , June 21, 1888.	

Sheet Iron from Store.

Common American.	
10 to 16	2.75 @ 2.80¢
17 to 20	2.85 @ 3.00¢
21 to 24	3.00 @ 3.10¢
25 and 26	3.20 @ 3.30¢
27 and 28	3.35 @ 3.45¢
29	3.50 @ 4.00¢
R. G. Cleaned.	
Galv'd, 14 to 20	4.50 @ 4.80¢
Galv'd, 21 to 24	4.80 @ 5.10¢
Galv'd, 25 to 28	5.25 @ 5.50¢
Galv'd, 29	5.60 @ 5.80¢
Galv'd, 30	6.00 @ 6.50¢
Patent Planchet.	10¢ @ 10¢
Russia	9¢ @ 10¢
American Cold Rolled B. B.	5¢ @ 7¢

English Steel from Store.

Best Cast	15¢ @
Extra Cast	16¢ @
Swaged Cast	17¢ @
Best Double Shear	15¢ @
Slitter, 1st quality	12 1/2¢ @
German Steel, best	10¢ @
2d quality	9¢ @
3d quality	8¢ @
Sheet Cast Steel, 1st quality	14¢ @
2d quality	14¢ @
3d quality	12 1/2¢ @

METALS.

Tin.

Sanca, Pigs	24¢
Straits, Pigs	24¢
English, Pigs	24¢
Straits in Bars	25¢

Tin Plates.

Charcoal Plates.—Bright.	
Melvin Grade.	
IC 10 x 14	\$5.75 @ \$6.00
IC 12 x 18	6.00 @ 6.25
IC 14 x 20	5.75 @ 6.00
IC 20 x 28	12.25 @ 12.50
IX 10 x 14	7.25 @ 7.50
IX 12 x 18	7.50 @ 7.75
IX 14 x 20	7.25 @ 7.50
IX 20 x 28	15.25 @ 15.50
DC 12 1/2 x 17	5.50 @ 5.75
DX 12 1/2 x 17	7.00 @ 7.25
Calland Grade.	
IC 10 x 14	\$5.00 @
IC 12 x 18	6.25 @
IC 14 x 20	6.00 @
IX 10 x 14	7.50 @
IX 12 x 18	7.75 @
IX 14 x 20	7.50 @
Allaway Grade.	
IC 10 x 14	\$5.25 @
IC 12 x 18	5.50 @
IC 14 x 20	5.25 @
IX 10 x 14	10.75 @
IX 12 x 18	6.25 @
IX 14 x 20	6.50 @
IX 20 x 28	12.50 @
DC 12 1/2 x 17	5.00 @
DX 12 1/2 x 17	6.00 @

Coke Plates.—Bright.

Steel Coke.—IC, 10 x 14, 14 x 20	\$4.80 @
10 x 30	7.50 @
20 x 28	10.00 @
IX, 10 x 14, 14 x 20	5.50 @
IX, 10 x 14, 14 x 20	4.70 @
Dean Grade.—IC, 14 x 20	\$4.62 1/2 @
20 x 28	9.25 @
IX, 14 x 20	5.62 1/2 @
20 x 28	11.37 1/2 @
Abecarne Grade.—IC, 14 x 20	4.50 @
20 x 28	9.00 @
IX, 14 x 20	5.50 @
20 x 28	10.80 @

Tin Boiler Plates.

XXX, 14 x 26	112 sheets @ \$12.50 @ \$12.75
XXX, 14 x 28	112 sheets @ 12.75 @
XXX, 14 x 31	112 sh ts @ 14.25 @

Copper.

Duty: Pig, Bar and Ingot, 4¢; Old Copper, 3¢	
Manufactured (including all articles of which Copper is a component of chief value), 4¢ ad valorem.	

Ingot.

Lake	@ 17.50¢
"Anchor" Brand	@ 17¢

Prices adopted by the Association of Copper Manufacturers of the United States, December 10, 1887, being quotations for all sized lots.

Not wider than	Not longer than	And longer than	Weights per square foot and prices per pound.							
			Over 64 oz.	32 to 64 oz.	16 to 32 oz.	14 to 16 oz.	12 to 14 oz.	10 to 12 oz.	8 to 10 oz.	Less than 8 oz.
30—72	25	25	25	26	27	28	31	33		
31—72	25	25	25	26	27	28	30	34		
36—96	25	25	25	27	29	31	33	36		
36—96	25	25	26	28	30	34	38			
48—96	25	25	27	29	31	35				
48—96	25	25	28	30	32	36				
60—96	25	25	28	31						
64—96	26	27								
84—96	27	29								
Over 84 in. wide	28	30								

All Bath Tub Sheets. 16 oz. 14 oz. 12 oz. 10 oz. Per pound. \$0.28 0.30 0.32 0.35
Bolt Copper, 1/4 inch diameter and over, per pound.

Circles, 60 inches in diameter and less, 3 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 60 inches diameter, up to 96 inches diameter inclusive, 5 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles over 96 inches diameter, 6 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Segment and Pattern Sheets, 3 cents per pound advance over price of sheets required to cut them from.

Cold or Hard Rolled Copper, 14 ounces per square foot and heavier, 1 cent per pound over the foregoing prices.

Cold or Hard Rolled Copper, lighter than 14 ounces per square foot, 2 cents per pound over the foregoing prices.

Copper Bottoms, Pits and Flats.

14 ounces to square foot and heavier. Per pound. 28¢
12 ounces and up to 14 ounces to square foot. 30¢
10 ounces and up to 12 ounces. 31¢

Circles less than 8 inches diameter 2 cents per pound additional.
Circles over 13 inches diameter are not classed as Copper Bottoms.

Tinning.

Tinning sheets on one side, 10, 12 and 14 x 48 each. 8¢
Tinning sheets on one side, 30 x 60 each. 30¢
For tinning boiler sizes, 9 in. (sheets 14 in. x 60 in.), each. 15¢
For tinning boiler sizes, 8 in. (sheets 14 in. x 56 in.), each. 12¢
For tinning boiler sizes, 7 in. (sheets 14 in. x 52 in.), each. 12¢
Tinning sheets on one side, other sizes, per square foot. 2 1/2¢
For tinning both sides double the above prices.

Planished Copper List May 5, 1888. Net

Brass and Copper Tubes.

Seamless Copper.	Seamless Brass.
3/8 inch 1/2 lb. 50¢	3/8 inch 1/2 lb. 47¢
1/2 " " 44¢	1/2 " " 41¢
3/4 " " 42¢	3/4 " " 39¢
1 " " 40¢	1 " " 37¢
1 1/4 " " 38¢	1 1/4 " " 35¢
1 3/4 " " 37¢	1 3/4 " " 34¢
2 " " 34¢	2 " " 31¢

Roll and Sheet Brass.

Discount from list. 10 @ 15¢

Spelter.

Duty: Pig, Bars and Plates, \$1.50 @ 100 lb. 51¢
Western Spelter. 51¢
"Bergenport" 51¢
"Bertha" 7 1/2¢ @ 5¢

Zinc.

Duty: Sheet, 2 1/4¢ @ 100 lb. 61¢
600 lb casks. 61¢
Per lb. 7¢

Lead.

Duty: Pig, \$2 @ 100 lb. Old Lead, 2¢ @ 100 lb. Pipe and Sheets, 3¢ @ 100 lb.
American. 51¢
Newark. 51¢
Bar. 51¢
Pipe, subject to trade discount. 61¢
Tin-Lined Pipe, subject to trade discount. 15¢
Block Tin Pipes subject to trade discount. 40¢
Sheet, subject to trade discount. 7 1/2¢

Solder.

1/2 @ 1/4 (Guaranteed). 15¢
Extra Wiping. 13¢
The prices of the many other qualities of Solder in the market indicated by private brands vary according to composition.

Antimony.

Cookson. 13 1/2¢ @ 14¢
Hallett's. 11 1/2¢

Plumbers' Brass Work.

Ground Bibbs and Stops. 55¢ @ 10¢
Ground Stops, Hydrant Cocks, &c. 55¢ @ 10¢
Corporation Cocks. 55¢ @ 10¢

Corporation Cocks, "Muelier" Pattern, from Western list. 55¢ @ 10¢
Ground Basin and Shampooing Cocks. 50¢ @ 10¢
Compression Basin Cocks. 50¢ @ 10¢
Compression Basin and Sink Cocks. 50¢ @ 10¢
Compression Pantry Cocks. 50¢ @ 10¢
Compression Double Basin and Shampooing Cocks. 50¢ @ 10¢
Compression Double Bath Cocks. 50¢ @ 10¢
Compression Bibbs, Urinal Cocks, Fill Cocks, Stops, Hopper Cocks, Hydrant Cocks and Ball Cocks. 50¢ @ 10¢
Basin Plugs and Basin Grates. 55¢ @ 10¢
Bath and Wash Trav Plugs. 55¢ @ 10¢
Bath Wastes and Washers, Bath and Hamm Valves, Sewer and Vacuum Valves, Cistern Valves, Pump Valves and Strainers, Ship Cistern Valves and Suction Baskets. 55¢ @ 10¢
Basin Clamps, Basin Joints and Strainers. 55¢ @ 10¢
Boiler Couplings, Ground Face, per set \$1.25. 10¢ @ 10¢
Boiler Couplings, Plain Face, per set \$1.20. 10¢ @ 10¢
Water Back Valve and Plain Couplings, Soldering Nipples and Unions. 55¢ @ 10¢
Union Joints. 60¢ @ 10¢
Hydrant Nozzles, Handles and Guides, Sockets and Clamps, Street Washer Screws and Guides. 55¢ @ 10¢
Hose Goods. 55¢ @ 10¢

Steam and Gas Fitters' Brass and Iron Work.

Discount per cent.
Brass Globe Valves. 60¢ @ 10¢
Finish'd Brass Globe Valves, with Finish'd Brass Wheels. 40¢ @ 10¢
Brass Globe Valves, with Patent Wood Wheels. 60¢ @ 10¢
Brass Globe Angle and Corner Valves. 60¢ @ 10¢
Brass Radiator Angle Valves. 60¢ @ 10¢
Brass Radiator Angle Valves, Frink's Patent. 60¢ @ 10¢
Brass Cross and Check Valves. 60¢ @ 10¢
Brass Check Valves. 60¢ @ 10¢
Brass Hose Valves. 60¢ @ 10¢
Brass and Iron Frink Valves. 60¢ @ 10¢
Brass Safety Valves. 60¢ @ 10¢
Brass Vacuum Valves. 60¢ @ 10¢
Brass Whistle Valves. 60¢ @ 10¢
Brass Balance, Back Pressure and Foot Valves. 60¢ @ 10¢
Brass Butterfly and Throttle Valves. 50¢ @ 10¢
Brass Pump Valves. 50¢ @ 10¢
Brass Steam Cocks. 57 1/2¢ @ 10¢
Brass Service, Meter and Union Meter Cocks. 57 1/2¢ @ 10¢
Brass Whistles, Water Gauges and Oil Cups. 60¢ @ 10¢
Brass Hollow Plug, Tallow and Globe Oil Cups. 60¢ @ 10¢
Brass Lubricators. 60¢ @ 10¢
Brass Air Valves. 60¢ @ 10¢
Brass Air Cocks. 60¢ @ 10¢
Brass Gauge Cocks. 55¢ @ 10¢
Brass Cylinder Cocks and Steam Bibbs. 50¢ @ 10¢
Brass Swing Joints and Expansion Joints. 60¢ @ 10¢
Brass Test Pumps. 50¢ @ 10¢
Brass Steam Fittings, Rough. 60¢ @ 10¢
Brass Steam Fittings, Finished. 2 @ 10¢
Brass Union Joints. 60¢ @ 10¢
Brass Soldering Unions and Nipples. 55¢ @ 10¢
Brass Hose Fittings, Fusible and Boiler Plugs. 55¢ @ 10¢
Iron Body Globe, Angle, Cross and Check Valves. 65¢ @ 10¢
Iron Body Safety, Throttle, Back Pressure, Butterfly and Foot Valves. 65¢ @ 10¢
Iron Cocks, all Iron. 65¢ @ 10¢
All Iron Valves. 65¢ @ 10¢

Miscellaneous.

Discount per cent.
Cast Iron Fittings. 70¢ @ 10¢
Plugs and Bushings. 75¢ @ 10¢
Malleable Iron Unions. 67 1/2¢ @ 10¢
Malleable Iron Fittings. 75¢ @ 10¢

Paints.

Black, Lamp—Coach Painters'. 22 @ 21¢
" Ordinary. 6¢
Black, Ivory Drop, fair. 12 @ 15¢
" best. 22¢
Black Paint, in oil, kegs, 8¢; assorted cans, 11¢
Blue, Prussian, fair to best. 40 @ 55¢
" in oil. 45 @ 55¢
" Chinese dry. 70¢
" Ultramarine. 18 @ 30¢
Brown, Spanish. 14¢
" Van Dyke. 10 @ 12¢
Dryers, Patent American, ass'd cans, 9¢; kegs, 7¢
Green, Chrome. 15 @ 25¢
Green, Chrome in oil. 14 @ 18 @ 25¢
Green, Paris. good, 30¢; best, 25¢
Green, Paris in oil. good, 30¢; best, 35¢
Iron and Bright Red. 1/2 lb 24¢
Iron Paint, Brown. 1/2 lb 14¢
Iron Paint, Purple. 1/2 lb 14¢
Iron Paint, Ground in oil, Bright Red. 1/2 lb 64¢
Iron Paint, Ground in oil, Red. 1/2 lb 54¢
Iron Paint, Ground in oil, Brown. 1/2 lb 54¢
Iron Paint, Ground, Purple. 1/2 lb 64¢
Litharge. 64¢
Mineral Paints. 2 @ 10¢
Orange Mineral. 4¢
Red Lead, American. 64¢
Red Venetian (Eng.) dry. \$1.65 @ \$1.70
Red Venetian in oil. ass'd cans, 11¢; kegs, 8¢
Red Indian Dry. 9 @ 12¢
Rose Pink. 10 @

THE IRON AGE

THURSDAY, SEPTEMBER, 6 1888.

SPEECH RECORDERS AND REPRODUCERS.

For years the registering and reproducing of sound by mechanical means have been subjects of interesting study, the prosecution of which has finally given results promising to be of direct commercial value. There are undoubtedly some among our readers who remember the first measurable successful attempt in this line made public about ten years ago, the apparatus used being the Edison phonograph,

ferred the sound vibrations of the disk. A series of indentations were thus produced on the tinfoil, which, being a non-elastic substance, retained them. If now the part which the mouthpiece played was reversed, the indented tinfoil could be used to reproduce the sound. This was best effected by a special mouthpiece of larger size, with a diaphragm of similar construction. This was so adjusted that the point was made to work along the indentations, setting the diaphragm in vibrations, which, being communicated to

a number of experimental stages. In its present shape it gives every promise of meeting the requirements of a practical substitute for a stenographer, taking dictations as readily and, in fact, more accurately and reproducing them for transcription by typewriter or other means when required. For this purpose it will shortly be offered to the public. The main principle of Mr. Tainter's phonograph-graphophone is the same as that underlying Mr. Edison's improved apparatus, though in detail the two differ, as will be

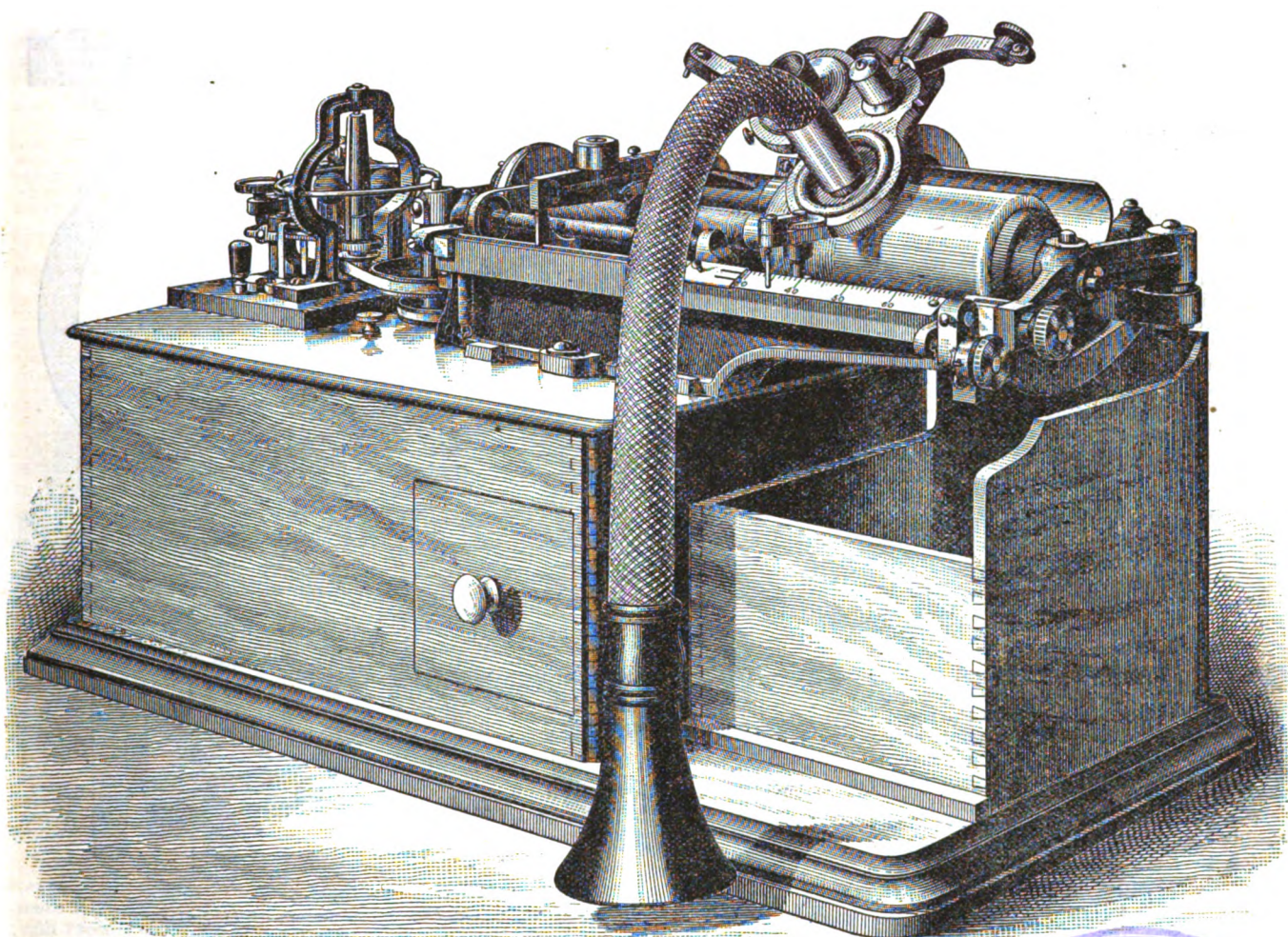


Fig. 1.—The Edison Phonograph.

SPEECH RECORDING AND REPRODUCING APPARATUS.

to descriptions of which it is of some interest to refer at the present time. Compared with what has more recently been accomplished, this original machine appears as a rather crude device, though the character of the results which it yielded was striking and the mechanism exceedingly simple. Briefly described, it consisted of a cylinder coated with tinfoil, and so mounted in a frame that by means of a crank and screw a rotary and at the same time a longitudinal motion could be imparted to it. The sound to be recorded was directed into a mouthpiece closed by a thin elastic metal disk. By means of a spring a small steel point, rounded at the end, was fixed to the back of the disk and pressed gently against the surface of tinfoil, to which it trans-

ferred the sound vibrations of the disk. A series of indentations were thus produced on the tinfoil, which, being a non-elastic substance, retained them. If now the part which the mouthpiece played was reversed, the indented tinfoil could be used to reproduce the sound. This was best effected by a special mouthpiece of larger size, with a diaphragm of similar construction. This was so adjusted that the point was made to work along the indentations, setting the diaphragm in vibrations, which, being communicated to

the air, reproduced the sound more or less accurately. Experiments with this early instrument, which we witnessed at the time, showed that sound could be reproduced with it so as to be heard by a large audience. The sheet of tinfoil could be kept for an indefinite period, and could be made to give reproductions when desired. The tinfoil cylinder was turned by hand, the attempt being made to give it as uniform and regular a motion as possible. For physical laboratory researches the apparatus was employed to a slight extent, but was not adapted to any special practical use.

The engravings which we give in this issue, however, show the latest and most improved form of the phonograph, which, as may be readily imagined, passed through a number of experimental stages. At present there are in existence only a few of Mr. Edison's phonographs of the latest type, and we were kindly given opportunity to examine, photograph and sketch one, and are thus enabled to first present it to our readers. It is in this form that it will be offered for public use. The general view will show at once that important modifications have been made. To begin with, in the later instruments, as in this one, the recording cylinder coated with tinfoil has been superseded by one of hardened wax. This is slipped over a mandrel mounted on a spindle which at the opposite end is threaded and rests in two bearings. Behind the spindle and the wax cylinder is a rod, upon which is arranged a slide, having at one end an arm, carrying a pivoted head with two dia-



phragms, one for recording and the other for reproducing sounds, and at the other end an arm adapted to engage a screw cut on the spindle, and also, by a hooked portion, another screw nearer the front, called a "kick-back" screw. The manner in which the arm is thrown into and out of gear with the screws will be better understood from Fig. 4. In Fig. 1 it will be noticed that at the extreme front right-hand end of the machine is a milled head controlling, as shown in Figs. 4 and 5, a small cam which can be made to tilt the pivoted bar A through a certain angle, which will be shown by an index and marks on the head B. Upon the angles through which the bar is tilted depends the height of its front edge. On this rests the hooked portion of the arm shown at the left in Fig. 1. The hook itself engages with the "kick-back" screw underneath, while the main spindle screw is engaged on the top by a threaded section on the under side of the arm. The recording and reproducing diaphragm frame also is supported on the edge of the bar A (Figs. 4 and 5). When this bar is so turned that its edge is at its lowest position, the arm at the left in Fig. 1 also is at its lowest position, and consequently its threaded position is in gear with the main spindle screw, imparting to the diaphragms a lateral movement. By slightly turning the head B the edge of the bar A is raised, raising with it the diaphragm frame, so as to have the stylus of whichever one may be in working position clear the wax cylinder and raising also the hooked arm, throwing it out of gear with the main spindle screw. The spindle and cylinder then revolve idly. By turning the head B further and raising the edge of the bar A still higher, the hook of the arm is brought into gear with the "kick-back" screw. This screw is of much coarser pitch than the other and revolves in the reverse direction, its office being, in reproducing, to bring the stylus on the reproducing diaphragm back to any desired point, as may be determined by the scale and index on the front of the machine, so as to repeat any particular part of the record. The arm may be thrown into or out of gear with the main screw by a treadle arrangement not shown, so that in transcribing the record on the wax cylinder by means of a typewriter, for example, the operator may stop the reproduction with his foot at any point, after having heard as much as he can conveniently remember, and proceed again when ready for the next sentence.

The position of the diaphragms can be readily adjusted by swinging the head in which they are mounted so as to bring either the recorder or the reproducer, as required, in its proper place in front of the wax cylinder. Suitable adjusting screws are, moreover, provided for securing a proper degree of pressure between the stylus of each diaphragm and the cylinder. The recording diaphragm, shown in its working position in our engraving, is furnished with a funnel-shaped mouthpiece, attached to a short, flexible tube, and in Fig. 2 is represented, with its accessories, on an enlarged scale. The diaphragm proper consists of a very thin plate of malleable glass and the stylus is attached to its center, being, in addition, pivotally connected to a spring arm fixed to the side of the diaphragm holder. Fitted slightly in advance of the stylus is a small knife, clearly shown in the illustration, which prepares a new, clean surface for the impression, cutting away all traces of previous records should there have been any on the wax. Of the reproducing diaphragm we give a detail view also, in Fig. 3. It consists of bolting silk thinly coated with shellac, and the needle or stylus is attached to its center through the intervention of a small piece of cork, being, besides, connected with the side of the diaphragm-holder, as in the case of

the recorder, by an arm, as shown. In reproducing musical notes the cork support just mentioned is replaced by rubber, this material having been found more satisfactory for the purpose because of its greater elasticity. The sound waves produced by the diaphragm are transmitted through a rubber tube, which is branched and provided at its extremities with ear pieces similar to those of a stethoscope. These are lightly placed in the ears of the operator. To make the necessity of this clear, we will explain that in the early form of phonograph distinctness and accuracy were sacrificed to volume of sound, while in the present instrument the reverse is the case; so that while

for action on the wax cylinder, or phonogram, as it is called. As this revolves the small knife previously mentioned, operating similarly to a lathe tool, prepares a smooth surface on the wax, and, in virtue of the arrangement adopted, is immediately followed by the recording stylus, which, under the influence of the vibrations of the glass diaphragm produced by the sound entering the mouthpiece, cuts into the wax and produces corresponding indentations.

The diaphragm with its stylus and knife is fed along by the screw cut on the main spindle, the "kick-back" screw being out of gear, and slowly traverses the wax cylinder. After the record is made, the carriage is again returned to the point of

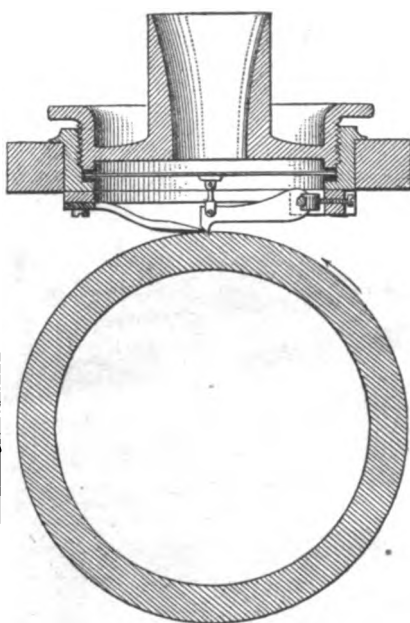


Fig. 2.—Recording Diaphragm.

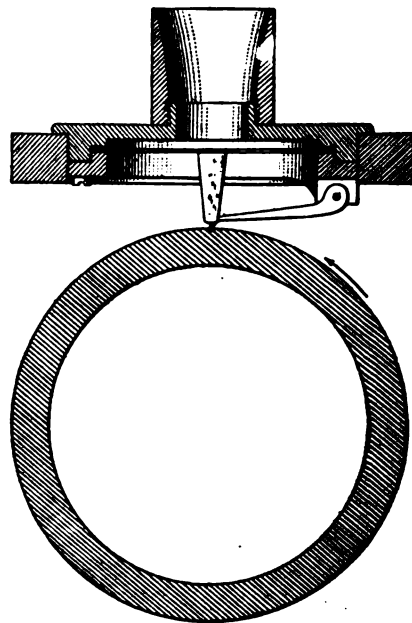


Fig. 3.—Reproducing Diaphragm.

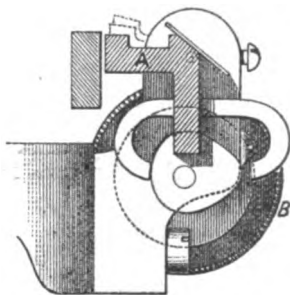


Fig. 4.—End View of Disengaging Gear.

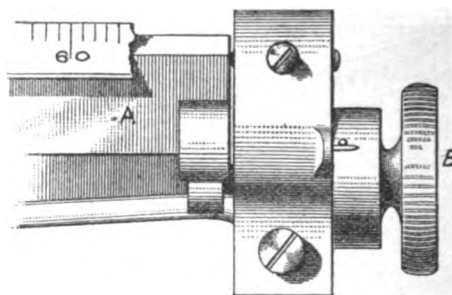


Fig. 5.—Elevation of Disengaging Gear.

SPEECH RECORDERS AND REPRODUCERS.

the reproduced sound is audible only to the operator equipped with the branched tube and ear pieces referred to, it is heard exactly as it was delivered into the mouthpiece against the recording diaphragm, all the variations of tone being faithfully given. So delicate is the reproduction that there is no difficulty in recognizing all the peculiarities of a familiar voice which may have been brought to act on the recorder. Motion for the instrument is supplied by a small electric motor in the box forming the base of the apparatus, connection being made with a battery. The governor only of the motor can be seen in Fig. 1, at the extreme left. The motion is transmitted to the main spindle and to the "kick-back" screw by a number of small belts and pulleys. From what we have thus far said it will perhaps have already been understood that in using the phonograph the recording diaphragm is first placed in its proper position

starting, the recording diaphragm is replaced by the reproducing diaphragm, and the carriage is again moved forward by the spindle screw as the cylinder revolves, causing the stylus of the reproducing diaphragm to traverse the path made by the recording needle. As the point of the curved wire attached to the diaphragm follows the indentations of the wax cylinder, the reproducing diaphragm is made to vibrate in a manner similar to that of the recording diaphragm, thereby faithfully reproducing the sounds uttered into the receiving mouthpiece.

A little thought will suggest a variety of uses for the phonograph. It may be employed for dictations and testimony in court, for reporting speeches, for the reproduction of vocal music, for teaching languages, for correspondence, &c. In dictating, one may talk as rapidly as one chooses, every word and syllable will be caught upon the delicate wax cylinder,

and afterward the latter may be transferred to the phonograph of a copyist, who may listen to the words of a phonogram and write out the manuscript. If any portion of the speech is not understood by the transcriber, it may be repeated as often as necessary. In a similar manner a compositor may set his type directly from the dictation of the machine, without the necessity of "copy," as it is now known. The wax cylinders are very light, and may readily be mailed in specially devised mailing cases. A number of records may be made on each cylinder owing to the thickness of the wax walls, the surface of which is cleared before every new series of impressions by the knife which travels in advance of the recording stylus. A performance of the apparatus which we had the pleasure of attending a few weeks ago was very striking and demonstrated in an entirely satisfactory manner, its capacity for accurate sound reproduction.

Similar in principle to the phonograph, as we have stated in the foregoing, is the

pared hardened wax and is very light. Not more than one tracing over its surface can be made, but its cheapness obviates the objection which might otherwise be raised to throwing it away and substituting a new one with a fresh surface. Below the cylinder is arranged a pan for receiving the fine shreds of wax which the recording stylus cuts from it, the number of grooves to the inch being about 160. At the right hand of the instrument is arranged a small rock shaft, provided with a cross arm and two keys working a clutch, by which the driving wheel is thrown into and out of connection with the gearing of the machine.

Upon the tube which incloses the feed-screw is placed a counter-weighted saddle, A, provided with a follower, which enters the slot of the tube and engages the feed-screw. The saddle carries a frame, in which is arranged a diaphragm of mica provided with a stylus, which engraves the record in the surface of the cylinder. The arrangement will be more readily understood by referring to Fig. 7, which repre-

recorder, a light spring, however, being used to press the stylus against the record cylinder. This spring is not necessary in the case of the recorder, since the weight of this with its attachments is much greater and amply sufficient to give a satisfactory impression on the wax.

In reproducing what has been recorded on the cylinder the recorder is replaced by the arrangement just described, and ear pieces of the branched tube are adjusted in the ears of the operator. The apparatus being put in motion and one of the small clutch keys shown on the right of the machine being pressed the reproduction of what is recorded on the wax cylinder commences, and when as many words as is desired are produced a slight pressure on the second key stops the cylinder, while the motion of the driving-wheel at the left continues, and the words reproduced are printed by the type-writer. The first key is then pressed again, and a few more words of the record produced, which are in turn printed by the type-writer, and so on throughout the record. The capacity

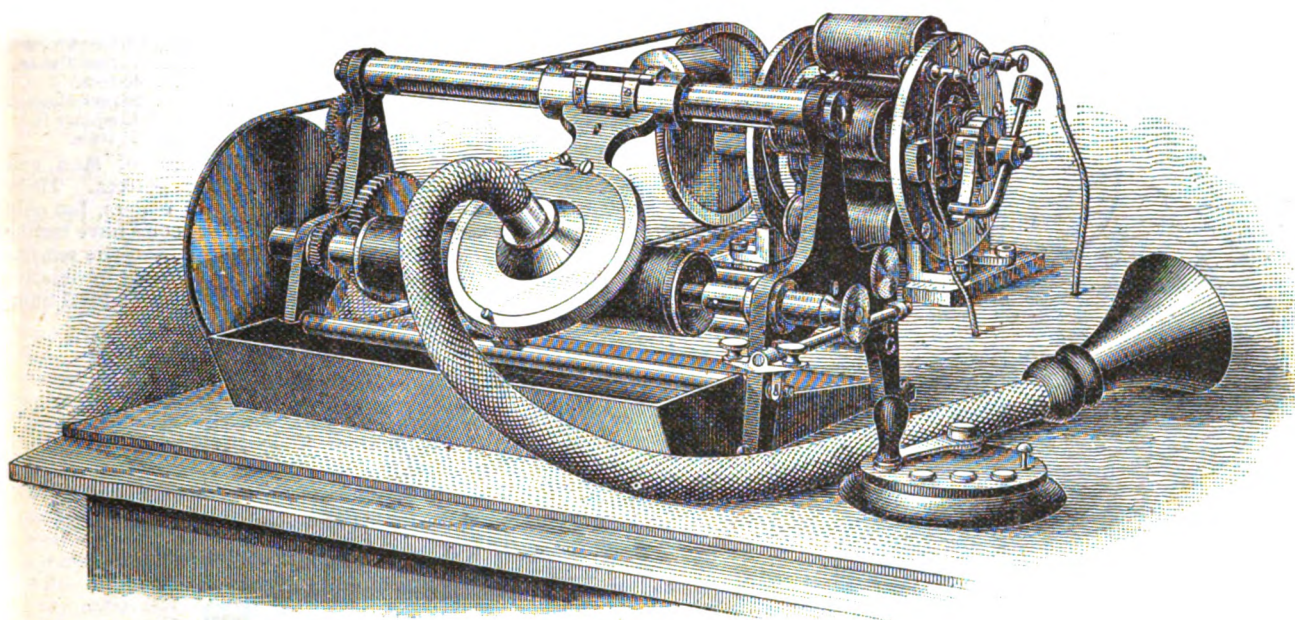


Fig. 6.—The Phonograph-Graphophone.

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phonograph-graphophone, invented a number of years later by Mr. Charles Sumner Tainter and rapidly developed by him into a practical and commercially valuable machine. Our engravings of it will show that, as compared with Mr. Edison's device, it is an exceedingly simple piece of apparatus. Fig. 6, which we prepared from a photograph, represents a general view. The frame of the machine consists of end pieces connected by longitudinal rods. In the top of the frame is journaled a fine screw inclosed in a slotted tube, the screw being driven through a train of spur-wheels from the main shaft journaled in the lower part of the left-hand end piece. The main shaft, besides carrying the gearing which moves the feed screw, is provided with a conical chuck. In the opposite end of the frame is journaled a spring-pressed spindle, which also carries a conical chuck of the same form and size as that on the main shaft. The cylinder upon which the sound is to be recorded is received between these chucks in much the same manner as the bobbin is placed in the bobbin winder of a sewing machine, the cylinder being revolved by frictional contact with the chuck on the main shaft. The cylinder consists of a spirally wound strip of paper coated with a specially pre-

sents a section through the recording diaphragm and clearly explains its construction. It will be noticed that a metal bridge extends across the face of the diaphragm, being attached to opposite sides of the diaphragm holder, and rests, at its middle, upon the record cylinder a little in advance of the stylus, thus supporting the weight of the diaphragm and its direct attachments. The depth to which the stylus penetrates the wax coating is in this way also regulated. Fig. 7 shows, further, that the saddle A is made up of two parts, hinged on top so that, together with the diaphragm holder, it can readily be removed. The recording action is much the same as in the phonograph, the diaphragm with its stylus being fed along the axis of the wax-coated cylinder by the screw B, while tracing its record on the wax. A separate and smaller reproducing diaphragm also is used, its construction being illustrated in Fig. 8. The reproducing stylus is pivoted, as shown, and transmits its vibrations to the diaphragm through a delicate rod. From the diaphragm holder is led a flexible tube, branched as in the case of the phonograph, and similarly provided with ear pieces, the whole being shown in Fig. 9. It is mounted on the tube inclosing the feed-screw B, like the

of a wax cylinder 6 inches long and 1½ inches in diameter when dictated to at the rate of 150 words per minute is about 700 words, this, however, depending upon the surface velocity.

The groove cut in the wax by the recording stylus is only $\frac{1}{160}$ inch wide and less than this depth, and 161 grooves to the inch are cut on the cylinder. The total length of the record on a 6-inch cylinder will therefore be about 250 feet. Cylinders 2, 4 and 6 inches long are used. The operation of changing them does not occupy more than a few seconds. Motion is derived from a small electric motor of special design, the invention of Dr. Orazio Lugo, of New York, worked by a battery. In Fig. 6 it is seen at the left toward the rear. Changes of speed may be effected by a switchboard alarm in front, at the right.

It is of no little interest to note that within the past half year phonograph-graphophones have been to some extent in practical every-day use, and have demonstrated their entire practicability and value as labor-saving devices. They were used in Washington in both houses of Congress for work in connection with reporting the proceedings and also by members for the dictation of their correspondence, &c. We

understand that many of the leading stenographers and lawyers at Washington are also using them, and find them of great help in their work. Thousands of record cylinders have been issued to supply these machines. Like the wax cylinders of the phonograph, they can be made to reproduce the records on them over and over again, and can be sent through the mails in specially devised boxes.

Both Mr. Edison's and Mr. Tainter's machines are controlled by the North

Mr. Tainter's design bids fair to be the more extensively employed, the character of its work being highly satisfactory for the purpose held mainly in view, and its construction throughout being simpler than that of the phonograph proper. Perhaps our readers have arrived at the same conclusion after having compared the general views Figs. 1 and 6. At the same time, we do not wish to be understood as desiring to disparage in any way Mr. Edison's apparatus. Its design and con-

cent atlas which the Geological Survey of that State have prepared and published, will be sold at the price of 25 cents each, either singly or in lots. This price is said to cover simply the cost of paper, printing and postage. Nothing finer in the way of topographical maps has been done by any of the State Surveys, and a real public service has been rendered in making these sheets available at a price so reasonable.

Steam Trials of the Italian Armored Lepanto.

A paper of special interest was presented at the last meeting of the British Institution of Naval Architects by Major Soliani, giving particulars of the steam trials of the Italian ironclad Lepanto. In these trials it was the first time that a power of 16,000 indicated horse-power had been developed on board an ironclad, giving her a speed of over 18 knots, and that a large number of locomotive boilers, in connection also with boilers of a different kind, had been worked together with complete success. The principal dimensions of the Lepanto are as follows:—

Length between perpendiculars	400 feet 6 inches.
Breadth	72 feet 9 inches.
Depth, molded	46 feet.
Mean draft, normal	28 feet 4 inches.
Area of midship section	1843 square feet.
Displacement	13,851 tons.

The ship is entirely built of steel, and has no sheathing on her bottom. There are six compartments of boilers, but only the two near the engine-rooms have marine oval boilers, four in each, and the remaining four compartments have locomotive boilers, four in each, making a total num-

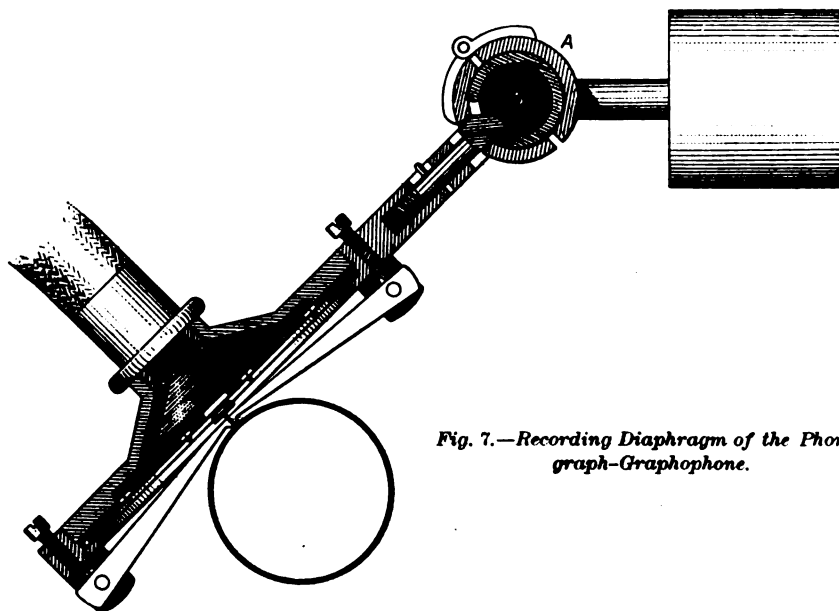


Fig. 7.—Recording Diaphragm of the Phonograph-Graphophone.

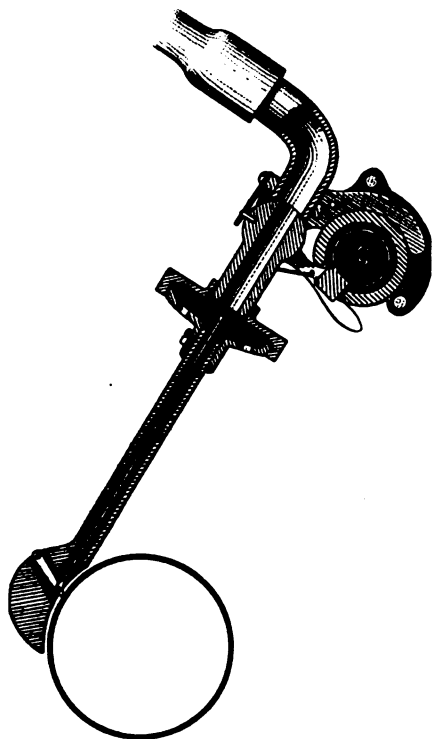


Fig. 8.—Reproducing Diaphragm.

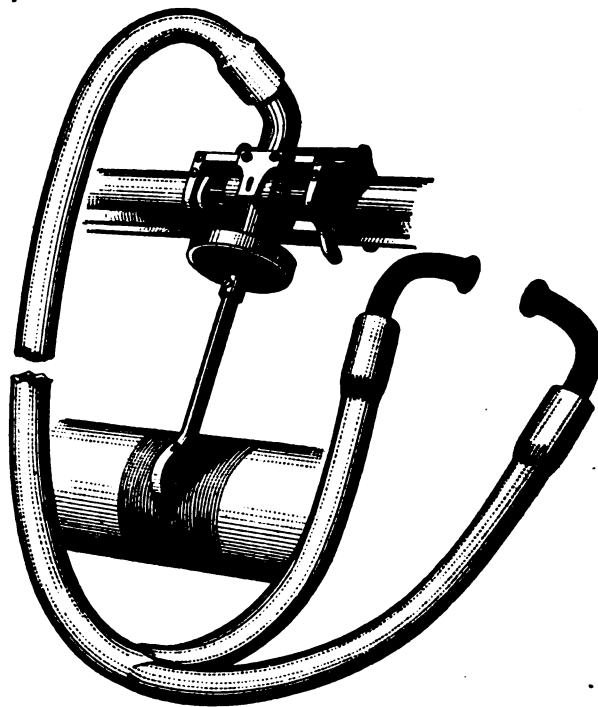


Fig. 9.—Reproducing Diaphragm and Attachments in Position.

SPEECH RECORDERS AND REPRODUCERS.

American Phonograph Company, 160-164 Broadway, New York, and will be offered to the public at the same fixed rates per year or part of a year, this plan being adopted in preference to disposing of them by outright sale. Prospective users can thus have their choice of either of the machines uninfluenced by difference in cost, and the demand for either the one or the other will be, to some extent, a measure of its popularity and special adaptation to every-day requirements. On our part it would seem to us that, for general utility, the phonograph-graphophone of

struction are characteristic of the inventor's high attainments in the line of applied science, and we are inclined to think that for special uses, as in laboratory work, it may be found superior to the other. But its greater complication in its present shape would seem to be a drawback of some importance. Whether or not we are correct in this will be shown by future developments.

Prof. George H. Cook, of New Brunswick, the State Geologist of New Jersey, announces that the sheets of the magnifi-

ber of eight oval marine boilers and 16 locomotive boilers. The trials were to be made in accordance with the following programme, proposed by Messrs. John Penn & Sons, and accepted by the Ministry of Marine:—(1) A trial with only two oval boilers lighted, and the after engines only at work on the compound system, to ascertain the most economical steaming of the ship. (2) A trial with the eight oval boilers lighted, the four engines working compound. (3) Ditto, with the four engines working direct expansion. (4) A forced draft trial with

only the after set of engines and boilers at work, the engines working direct. (5) A forced draft trial with all eight oval boilers and eight locomotive boilers lighted, the four engines working direct. (6) A full-power forced draft trial or trials with all the engines and boilers at work, the engines working direct. This programme was not completely carried out, on account of the ship having been put into commission, which prevented the final 18,000 indicated horse-power trial being made. The trials were made along the eastern coast of the Gulf of Genoa, from Spezia to Genoa and back, the two runs being altogether of over 80 nautical miles. A portion of the forward run from Spezia to Genoa was taken in each trial to bring up the engines to the desired speed. After the rather discouraging experience with locomotive boilers working in sets on board some ships, as the Flavio Gioja of the royal Italian Navy and the Polyphemus of the Royal English Navy, some fear was entertained that similar troubles might be experienced with the Lepanto, in which the difficulty appeared to be still greater, considering the large number of boilers to be worked together in so many different separate compartments. But nothing of the kind happened. Everything went to prove the contrary. From the very beginning of the preliminary trials, which took place toward the end of last year, the locomotive boilers gave evidence of their good working, which went on increasing trial after trial, so as to be now an established fact. They never primed or gave any trouble whatever. The feeding was occasionally uncertain, but the fault was due to air that collected in the main feed-pipe. This imperfection was removed, and on the last two trials the feeding was quite satisfactory. After each one of the last three forced-draft trials the locomotive boilers had tubes leaking, but in small number, and not more, comparatively, than the oval boilers, which, even in this respect, did not behave better. Moreover, there were discrepancies between the different compartments of boilers, locomotive as well as oval, which shows that the management of the fires has a great deal to do with this matter. The engines worked very satisfactorily all through the trials, without the slightest hitch occurring in any part of the whole machinery. This circumstance helped, no doubt, to some extent the good performance of the boilers, which had never to be checked or hampered when in full swing. The power developed was 16,150 indicated horse-power, which gave a speed of 18.38 knots, the displacement of the vessel at the time being 14,860 tons, and the mean draft of water 30½ feet.

This association of locomotive with ordinary marine boilers as a cheap way of getting a portion of the power required in war ships has attracted attention for many years, and would, no doubt, have been more widely developed had it not been for the somewhat discouraging experience which the system gave rise to in the English navy.

A Chicago Elevated Project.—Another elevated railway scheme has been projected in Chicago. On the 29th ult. articles of incorporation were recorded in the office of the Secretary of State of the Chicago West Division Elevated Railroad Company, with a capital of \$10,000,000. It is intended to construct a railroad from a point in the south town of Chicago, north of Harrison street, west of Clark street, south of the river, to the western limits of the city, between Harrison and Lake streets, with four branches. The board of directors are Andrew Onderdonk, of New York; James Ross, of Sherbrook, Quebec; William D. Howard, John J. P.

Odell, James Deering, George S. Willits and William G. McCormick, of Chicago. Henry B. Robbins and Charles L. Brooke are incorporators, but not members of the board of directors. The scheme of the incorporators is a big one. The route proposed is sufficiently indicated above, but it is claimed that with the exact line of travel they have in view no fine residences or buildings will be interfered with. The incorporators will, at an early day, apply to the Council for an ordinance permitting them to go ahead with their scheme. It is the idea to cross the river by means of the bridge, and it is said that the inconvenience caused by the opening of the bridge during the navigable season will be but small, as the cars, running on their own unobstructed roadbed, can make good time when in motion. The fare is to be 5 cents.

Paper Belting.

Messrs. Crane Bros., of Westfield, Mass., have contributed to Mr. Cooper's book on "The Use of Belting," some interesting particulars relating to their paper driving belts. These are made from pure linen stock and can be made of any desired thickness, width and length. They are recommended only for straight and unshifted belts, and none are made less than 5 inches wide. They will not stretch nor change shape, and being made all in one piece, of even thickness, will run smoothly and straight. They are claimed to be equal in durability with leather, and equal also in strength. They adhere to the pulleys very closely and generate no electricity while running. Furthermore, they are quite flexible, and are claimed not to crack in passing over pulleys even as small as 6 inches in diameter. They are not affected by heat at ordinary temperatures, nor by dust or oil, but will not run in water. Compounds similar to those used for stuffing leather belts, or black lead, mixed with sperm oil, are said to be very good to apply to these belts when dry and slipping.

Electric Motive Power.

The electric motor business which was in a nascent state a few years ago is now developing at an even faster rate than the electric light business, though the amount of capital invested and the value of the plant is comparatively small. At the present time there are in use, in Boston for example, a large number of small motors for various purposes, furnishing in all about, roughly estimating, 500 horse-power. In New York City it is estimated that there is about 800 horse-power furnished by electric motors for various small industries. In Philadelphia there are a considerable number of electric motors in constant use, and the same is true of Buffalo, Cincinnati and Cleveland and their number is rapidly growing in all the large cities. In Chicago and Detroit the number is smaller and the use somewhat restricted owing to the efforts being made by municipal authorities to have the wires put underground and the consequent difficulty in making additions to the systems of overhead wires. The motors in use range in power from ¼ horse-power to 15 horse-power. A number of motors of ½ horse-power and others of 25 horse-power are also in use. In addition to the largest cities mentioned above, there is a considerable number of motors used in the smaller cities, such as Bangor, Me.; Lowell, Newburyport, Lynn and Springfield, Mass.; Providence, Pawtucket and Woonsocket, R. I., and other of the smaller cities of the East, and in St. Louis, Kansas City and other Western cities.

The question naturally arises as to the uses which these motors, furnishing as

they do small amounts of power, are put. In a general way it may be said that they are employed in all those industries and work which has formerly been done by a small amount of steam-power or by the gas engines and water-motors which have been quite extensively employed during the last few years. They are employed for driving air compressors, bookbinding machinery, bakers' machinery, blowers, cranes, carpenters' machinery, cash carriers, coffee mills, churns, drug mills, dumb waiters, dentists' lathes, drill presses, elevators, grindstones, hydraulic presses, hatters' machinery, ice-cream freezers, jewelers' lathes, knitting machines, lathe working machinery, laundry machinery, looms, paper box machinery, polishing machines, pile driving, printing presses, quotation transmitters, sewing machines, stamping machines, ventilating machines, washing machines, and a hundred other small uses.

Perhaps the most important use of motors at present is on elevators, printing presses and sewing machines, and in each line a large and increasing number are constantly being used. The increase in the many different outside uses is even faster. Wherever a moderate amount of power is needed the electric motor can supply it. The economy of the stationary electric motor over small steam and gas engines is claimed to be considerable. It is based upon the fact that large engines consume much less coal for the power furnished than do small engines.

In the transference of power through the dynamo and motor to the machinery about 20 or so per cent. is lost, but even with this it can be seen that large power may be produced at a central station and sold out to consumers cheaper than they could produce it by small engines. Incandescent electric light lighting companies can afford to sell the motor power cheap, as the motor business is of great and positive advantage to them in giving employment and earning capacity to their plant when it would otherwise be idle and profitless. This arises from the fact that most of the electric lighting is done at night, and the machinery and plant of the company is then employed, while during the day time it would be idle. The advantage to the consumer of electric power is found partly in the greater neatness, cleanliness and compactness of the motor as compared with engines, and from the fact that the motors require no attendance and the power can be turned on or off by a switch. The motors themselves as mechanical devices are claimed to be about 25 per cent. cheaper than engines. In most cases the motors are sold outright to the consumers, and the power is leased, but sometimes both motor and power are leased.

The Italian Admiralty have recently caused to be carried out a number of experiments with a view to testing the comparative merits of castor oil and of olive oil for lubricating purposes on board ship. From the results obtained they have given orders that henceforth all exposed parts of machinery are to be lubricated exclusively with castor oil, while mineral oils are to be used for cylinder and similar lubrication.

The Southern Railway and Steamship Association have issued in pamphlet form the new classification of freight for the use of all lines between Eastern and Western points and Southern points. This classification went into effect on the first of this month.

Evans & Howard, of St. Louis, Mo., manufacturers of fire-brick, gas retorts and sewer-pipe, have issued a new catalogue.

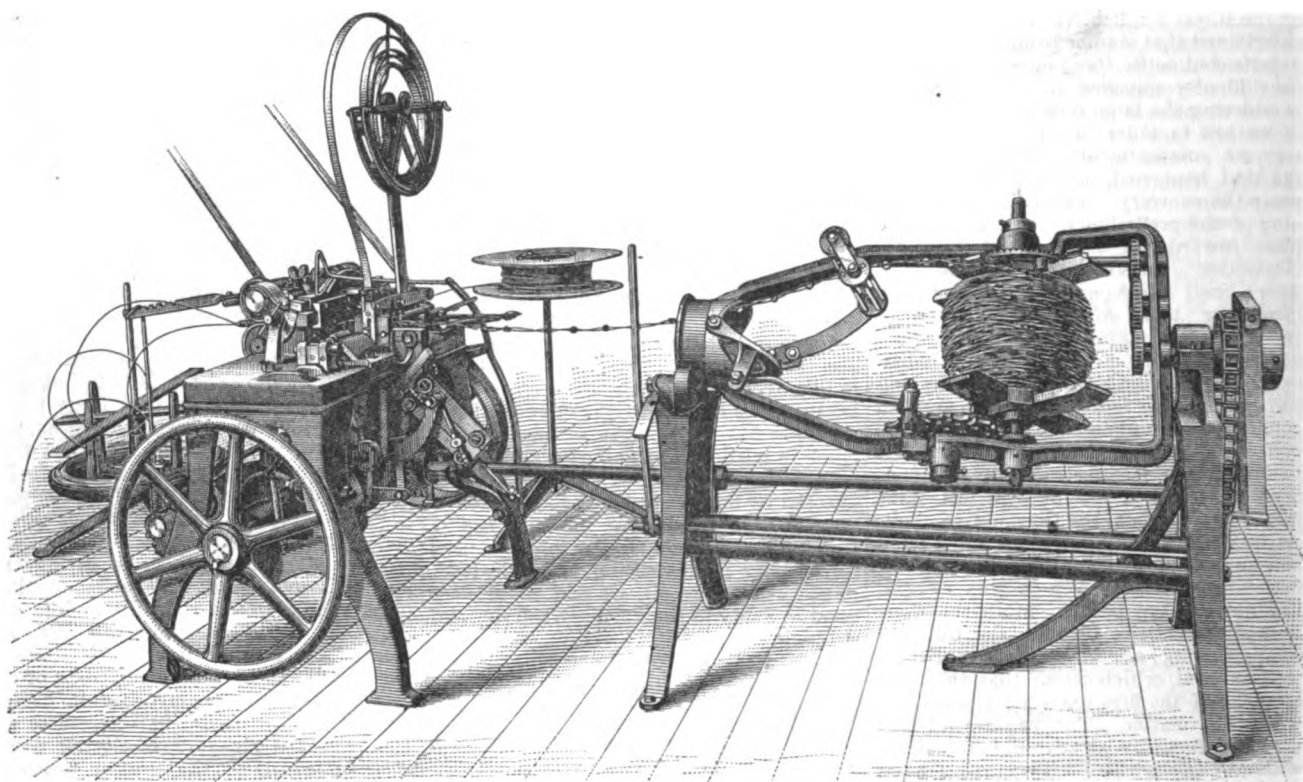
Peculiar Electrical Phenomena.

Some very singular electrical phenomena were observed on two very dry days at a printing office in Mayence, Germany, when the establishment seemed to be converted into a huge electrical battery. According to the *English Mechanic* electric sparks several centimeters long could be drawn with the fingers from all parts of the printing machinery, just as may be done from a charged electric machine. The action of the sparks became so pronounced that the layers-on and takers off (who, it should be remarked, in German printing offices are mostly young women) refused to work, as burning sparks were emitted every time the machines were touched with the hands. The electrical phenomena were most striking in the machines used for lithographic

The floors of the several machine rooms are also laid thick in asphalt, and the machinery is fixed direct to this flooring, so that it is likewise perfectly isolated. There are only a few iron columns having direct connection with the earth. On the morning of the day on which the startling phenomenon described was first observed, all the machine belts had been greased with a mixture consisting of resin and linseed oil, serving to increase the friction between the belts and the pulleys. As soon as the machinery was set in motion, each individual pulley was converted into an electric machine on a large scale, negative electricity being formed on the belt covered with resin, and positive electricity on the iron pulley. The stored electricity, of course, was immediately given off whenever one of the machines, which for the

ing only been issued November 22, 1887. Chester A. Hodge is the inventor of the present form of fencing made, also the owner of the machinery patents and builder of the machines, while the Larm Mfg. Company have the exclusive license for the use of the machinery and the manufacture of the fencing. At present four machines are in operation, but others are being built and six more will be running in time for the fall trade, to be followed by additional machines as fast as they can be completed.

The principles involved in the construction of the machine to make this fencing and to twist and spool it are very ingenious, and worthy of detailed description and illustration. We find, however, that the space at our command is too limited to admit of showing all the engrav-



MACHINE FOR MAKING SPUR WIRE FENCING, AT THE WORKS OF THE LARM MFG. CO., CHICAGO, ILL.

printing. A strong paper made of cellulose was being printed at the time, and the takers-off observed a slight crackling as the sheets, which adhered pretty closely to the oil-cloth covering of the cylinder, were being withdrawn. This crackling was finally developed into a loud explosion, accompanied by beautiful flashes from 10 to 12 centimeters (from 4 inches to 5 inches) in length. The discharges are stated to have been more effective the more quickly the sheets loaded with electricity were withdrawn. A small circular saw mounted about 4 inches from an iron column discharged at intervals of from 20 to 30 seconds, when driven, powerful electric sparks, accompanied by loud explosions, upon the column. These phenomena were observed for hours, and continued two days, when the printing office became free from electricity, and has remained so since.

The following explanation is given of the occurrence: The outer walls of the building in which the printing machinery is placed are separated from the surrounding soil by a thick layer of asphalt, serving to keep the moisture arising from the soil from penetrating the walls. In the present case the asphalt at the same time served to isolate the electricity generated within.

time being were changed into accumulators or secondary batteries, was "tapped."

Spur Wire Fencing Machine.

The Larm Mfg. Company, 84 and 86 Market street, Chicago, have succeeded, after a long series of experiments, in perfecting a machine to manufacture their "Harmless Spur Wire" fencing. This fencing is intended to compete with barb wire, to which it is claimed to be preferable, as it will turn cattle without severely pricking them. Instead of a rigid barb the Larm wire has a revolving spur, or toothed wheel, which works on a small piece of wire extending between the two strands. The engravings on the opposite page explain the construction. The spurs are 3, 4 or 6 inches apart, and consist of star-shaped pieces of steel so mounted on a cross wire as to revolve easily. Fig. 1 shows the twisted wire with the spurs thrown at right angles, and Fig. 2 shows the strands straight, both kinds being made by the company. This fencing was invented several years since, but the machinery for its manufacture has so recently been perfected that it is a comparatively new article in the market, the patents hav-

ings (about ten in number) that are necessary to a full understanding of the various operations, and must confine ourselves, therefore, to the use of a perspective view only. This, however, will give a fair idea of the general character of the design. We would refer those of our readers who are specially interested in the machine to the patent office records, the specification bearing the number 373,458.

The main idea is, of course, the revolving spur, which takes the place of a rigid barb, and thus overcomes an objection often made to the use of barb wire fencing. This spur, as mentioned above, is of star shape and is cut from steel hoops or strips, 1 inch wide and of No. 22 gauge. At first these stars were cut out by one machine and fastened in place by another, but now this work is all done on the single machine, which we illustrate. The steel hoop is coiled on a reel on top of the machine, as shown at the left. It is intermittently fed forward into position in front of a punch for punching the central hole in the star, this hole being punched before the star is cut out.

The punch and die for cutting out the star are located further along in the path of the star-strip, and operate to cut out the star at the end of the strip at the same

time and by the same movement that the hole is punched in the strip for a succeeding star. The star-punch and its operating rod or slide are made hollow, and a rod or pushing device reciprocating in it serves to push the star cut from the strip out of the female die and in front of or into the star-pocket of a reciprocating slide, by which the star is fed into position between the two fence wires and in front of the cross pivot wire. This star-feed slide operates in a vertical plane passing between the two fence wires. The



Spur Wheel Fence Wire.—Fig. 1.—Twisted Wire.

pivot wire is then pushed forward just under the fence wires and inserted through the hole in the star. A horizontally reciprocating slotted pivot-bending nose or horn having guide holes through which the two fence wires pass is then moved forward into position for supporting the pivot wire, while the ends of the pivot are bent over or around the slotted horn, and the fence wires, and at the same time a vertically reciprocating knife moves up and severs the pivot from the pivot-wire. This knife operates in conjunction with an opposing stationary knife. A pair of vertically reciprocating pivot benders or slides—one on each side of the fence wires and the horn, and one of which is integral with the movable knife before mentioned—move up (their motion being simply a continuation of the upward movement of the knife) and bend the two ends of the pivot up vertically or at right angles. A pair of horizontally reciprocating benders or slides then move inward toward each other over

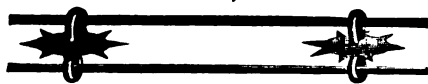


Fig. 2.—Wire with Straight Strands.

the top of the lower or vertically moving reciprocating benders and bend the ends of the pivot down horizontally together. The slotted nose or horn then withdraws, and a clincher, occupying the space between the vertically moving benders and secured rigidly thereto, moves up and gives the finishing bend to the middle of the pivot. The benders and knives are then withdrawn and simultaneously the two fence wires and the star-strip are fed forward, and the star-feed slide also at the same time moves a second star into position between the fence wires.

The wire for the strands is fed from two reels in the rear, and the wire for the cross piece or pivot supporting the spur is fed from a reel at one side. The right-hand portion of our engraving represents the spooling and twisting machines, of which the operation, we think, is readily apparent.

Returning to the product of the machine, we note that the makers claim the wire to be harmless to stock, because it will not gash the skin, although it will prick sufficiently to warn animals away, and to be more plainly seen by stock than ordinary barb-wire fencing. The manufacturers assert, also, that the increasing demand from a widening circle of consumers supports these claims and demonstrates the satisfaction which the use of the wire is giving.

The new railroad freight tariff from Pittsburgh to all Pacific coast points was issued on Friday, the 24th ult., and will

go into effect on September 1 next. The rates have been advanced slightly. In some cases the advance is on the commodity and others on the rate. The new rates from Pittsburgh, Buffalo, New York and common points East, and West of Atlantic seaboard common points will be: First class, \$4; second, \$3.50; third, \$2.80; fourth, \$2.20. Class A, \$1.95; B, \$1.75; C, \$1.40; D, \$1.25; E, \$1.15. The rates on iron will be: Carloads, \$1; less than carloads, \$1.20. This rate is special. The rate formerly was 99 cents and \$1.08.

Labor at the Pencoyd Works.

Two Philadelphia newspapers, the *Record* and the *Times*, published charges that the A. & P. Roberts Company, of the Pencoyd Iron Works, near Philadelphia, employed imported Hungarian and Polish labor, and the employees were huddled together in "dirty" houses, and that the men were kept poor by means of a "pluck-me" store. In reply thereto the firm have prepared a statement, from which we quote the following:

The Pencoyd Iron Works at present employ about 1400 men. Of this number 132 are Hungarians and Poles. The appended table gives their number, wages per day and character of the work performed:

No. of Men.	Wages per day.	Occupation.
37.....	\$1.10.....	Laborer.
1.....	1.15.....	Laborer.
1.....	1.20.....	Laborer.
62.....	1.25.....	Laborer.
20.....	1.35.....	Laborer.
2.....	1.40.....	Shears.
2.....	1.50.....	Bridge shop.
2.....	1.55.....	Bridge shop.
4.....	1.80.....	Mill.
1.....	2.50.....	Mason.
1.....	2.75.....	Mason.
1.....	3.00.....	Mill.

132

The men paid \$1.10 per day perform a class of shifting labor which is necessary around every works of this size and character. It is not steady work, but embraces such occupations as loading ashes, unloading cars, &c. The work being irregular in its character varies from day to day and has always been supplied from men who have been in the country apparently only a short time and have not, as yet, been able to find more permanent occupation.

We positively deny ever having imported any cheap contract labor, and there is no Hungarian or Pole at present in our works who has not applied for work of his own accord and has been hired entirely upon the question of his fitness for the intended occupation, with no more reference to his nationality than to the names and residences of his grandparents.

There are at present 49 tenement houses belonging to the works, occupied as follows:

No.	Nationality.	Average No. each house, including children.
13	German.....	6.0
4	English.....	5.7
13	American.....	5.0
14	Irish.....	6.4
2	Welsh.....	6.0
3	Polish.....	3.3

49

The four houses referred to by the *Record* as "Noah's Ark," and containing "about half a hundred men," are leased to four German families. Each house contains three sleeping rooms, with beds. No room has more than two adults. Each house has four boarders only. By an examination of the table it will be seen that the highest percentage of inmates are in the houses occupied by persons of Irish nationality, while the lowest percentage are in the houses occupied by Poles.

Referring to the statements made by the *Record* in regard to a company store, we have to say that the store spoken of is a

small one, started some years ago for the purpose of supplying necessary goods to people living on the west side of the Schuylkill River, who were obliged to cross the river daily for the necessary articles of food. There is no compulsion whatever used in the matter, and many of the customers are not from among our own people. The sales average \$800 per week, while our pay-roll is \$15,000 per week, and, except in a small number of cases, mostly made up of single men, all accounts are paid in cash by the customers.

The steamship agency we are accused of holding for the purpose of importing emigrants has been for many years in the hands of our paymaster for the purpose of sending money to families and friends of the employees of the works who may not be in this country, and has sold during the last 20 months the following tickets: For 6 men, 15 women, 22 children and 1 excursion ticket.

English Armor Plate Trials.—Recent English armor plate trials have given some noteworthy results according to the *London Engineer*. The plate tested was manufactured by Messrs. Cammell & Co., and was forged under their new hydraulic press, which is capable of exerting a pressure of 5000 tons. In its way it was quite as remarkable as the compound plate which broke up all the shot, both steel and chilled, directed against it. It measured 8 feet x 6 feet, and was of a thickness of 10 inches. The composition of the steel is a trade secret, but its flexibility was such that it passed through the ordeal under fire without splintering or falling in pieces like the Creusot plates. Five shots were discharged against it from a 6-inch gun at 30 feet range. Two were chilled Palliser projectiles, while the remainder were Holtzer solid forged steel shot. The charge was 42 pounds, the muzzle velocity 1920 feet per second, and the muzzle energy 2556 foot-tons. The chilled shot were entirely broken up, but the indents in the plates were deeper than in the case of compound armor. The steel projectiles were pointed diagonally across the face of the plate, from the bottom right corner to the top left corner, the difference in the inclination of arm having an important effect upon the ballistic value of the various rounds. The first shot fired at the normal penetrated the plate, the base being about 5 inches below the surface. The second shot, fired at an inclination of 8°, buried itself in the target with the exception of 2½ inches; while the third and last round, fired at a deviation of 16° from the normal, protruded about 7 inches from the face. None of these projectiles were broken up, but plugged themselves into the plate, where they remained firmly fixed. The armor plate itself at the end of the experiment, though cracked in places, retained its position on the backing, and was in a fair state of preservation. Though the shot discharged point-blank at the target penetrated the plate, none succeeded in getting through, but were arrested and held firmly in the grip of the metal.

The Jersey City Board of Works received bids for purifying the present water supplies and for a new supply outright. The bids for purifying included the erection of a plant capable of aerating 24,000,000 gallons daily, as follows: Jewell Water Company, of Chicago, \$263,975; Philadelphia Water Purifying Company, \$210,000; United States Sanitary Filter Company, of New York, \$250,000; Hagerman & Olyphant Filter Company, \$275,000; American Filter Company, of Chicago, \$250,000; Hyatt Pure Water Company, \$350,000. The proposals for the new water supply were for the delivery at the

Belleville reservoir of 20,000,000 gallons daily. The Montclair Water Company, which proposes to obtain its supplies from the upper Passaic, bid \$40 per 1,000,000 gallons, and the Lehigh Valley Railroad, which proposes to use the Morris Canal to bring water from Lake Hopatcong to Jersey City, \$42 per 1,000,000 gallons. The Commissioners decided to call a public meeting for September 8, to discuss the entire question.

Improved Screw Gang Saw.

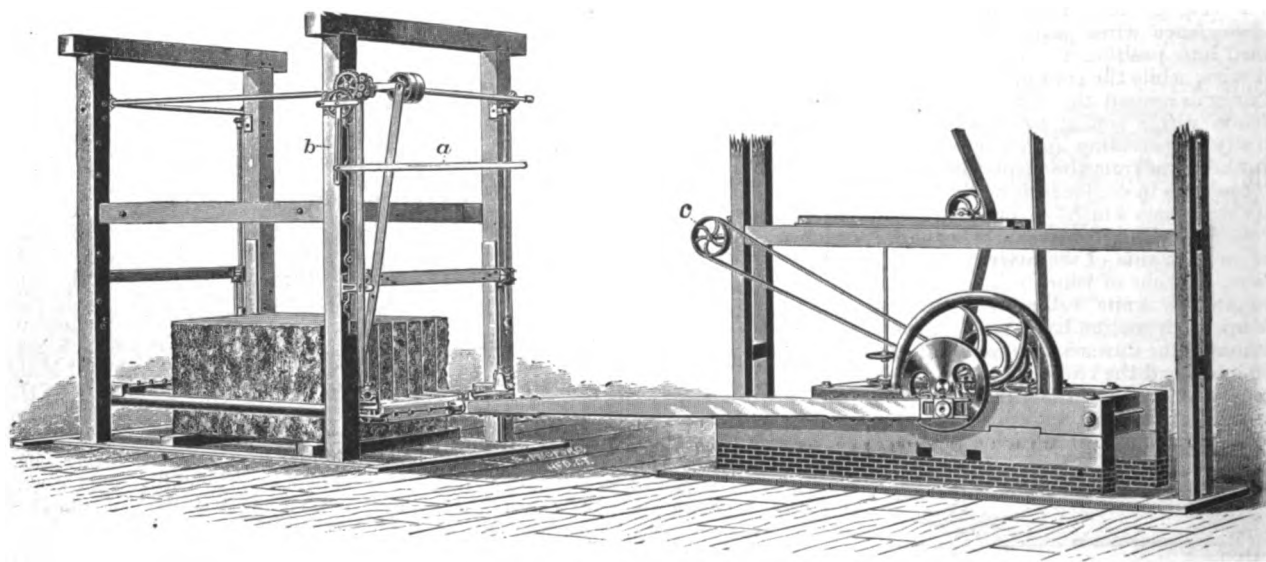
The Merriman screw gang for sawing stone, one modification of which is here shown, has been in use for a number of years and has demonstrated itself to be one of the best stone sawing machines made. Its superiority is largely due to the fact that the frame which carries the saws is fed down to the stone by a positive feed which is automatic and adjustable to stone of different degrees of hardness, and at the same time the frame is held firmly down while in action, so that the pressure of the

The "Carload" Lot Cases.

A "brief" has just been filed with the Interstate Commerce Commission which will undoubtedly prove of interest to the entire commercial community. The "brief" appears in what have been popularly denominated the "carload lot cases," three in number, which were brought on behalf of a committee of the New York Board of Trade and Transportation, by Thomas L. Greene, as manager of the Merchants' Freight Bureau of New York, on behalf of some hundreds of retail merchants in the interior States, and by Francis H. Leggett & Co., of New York, against the Trunk Line railroads. They were tried before the Commission in January last, after a mass of evidence had been taken at Mr. Fink's office in this city by deposition, and have just been submitted for decision. The plaintiffs' counsel are Simon Sterne and Charles F. Beach, Jr., of New York, Mr. Thomas L. Greene appearing in person. The counsel

and conditions attending the transportation to warrant such increase. The testimony shows that these great differences between carloads and less than carloads were imposed by the railroads for two reasons: one was to give back to the local roads their old local rates. It is a well-known fact that grocery staples were carried from station to station before the passage of the Interstate Commerce Act by the railroads at rates which were grossly out of proportion to the charges made for the transportation of like articles between competitive points. This gross discrimination against the small towns and villages was one of the main reasons for the passage of the Interstate Commerce Act, and it is shown that the present classification and tariff was arranged in this manner to give back to the local roads under another form the same local rates which they had before the passage of the act and which the act forbids.

It is also of interest in this connection to notice that before the 1st of April, 1887, twenty thousand pounds constituted the



IMPROVED SCREW GANG SAW, BUILT BY THE LINCOLN IRON WORKS, RUTLAND, VT.

saws upon the stone is uniform. This construction also counteracts the thrusting action of the pitman upon the saw frame, which becomes excessive when the saws are either at the top or bottom of a block, causing a jumping motion of the frame and saws, largely neutralizing their cutting action and destroying the machine itself.

The machine as shown is made by the Lincoln Iron Works, of Rutland, Vt., and has a saw frame of iron, the sides being made of heavy wrought-iron tubing and the heads or ends of 12-inch channel bars, two for each head. These are secured to each other by a strong casting, and when the saws are in it the frame is absolutely rigid. The crankshaft is made of hammered iron, and is 4½ inches in diameter. The bearing on the crank end is forged larger, being 6½ inches, and the pillow block for this end is made adjustable. The crank-wheel, which is keyed on this enlarged part, is made with a counter weight which balances, or nearly so, the weight of the pitman and its attachments. The wrist-pin is cast on to the crank-wheel and is made of ample size to prevent cutting and wear. The increase of speed and the addition of automatic feeding devices have made a great difference in the amount of cutting one of these machines will do. Some of the later machines have cut as much as 8 inches per hour, actual depth of cut, in Bedford, Ind., limestone, and as high as from 3 to 4 inches per hour in granite.

for the railways include such well-known lawyers as Judge Logan, for the Pennsylvania; Frank Loomis, for the New York Central; James A. Buchanan, for the Erie, and John K. Cowen, for the Baltimore and Ohio Railroad. The review of testimony and "brief" summary, as furnished to the press by complainants' counsel, reads substantially as follows: The matter complained of is the imposition of excessively high rates upon less than carload shipments from the East to the West on grocery staples and various articles of household and common use, as compared with very much lower rates for the carload quantities on the same articles. These discriminations were put by the railroad people into their West-bound tariffs since April 1, 1887, so that whereas ten years ago the classification from the seaboard West-bound had only 30 articles which took a less rate in carloads than for small quantities, the number now having such differences for quantity exceed 900 articles.

To arrange for the new state of things which was necessitated by the passage of the Interstate Commerce law, the railroads advanced the rates for small quantities of these staples on the 1st of April, 1887, to figures higher than for any time during the previous ten years, so that at the present time these rates for small quantities exceed the rate on the same articles when in carloads, in some instances, by more than 100 per cent., and this, too, without any change in the circumstances

capacity of a car and was considered a carload quantity, but since that time no shipment for less than 24,000 pounds can, according to the rule imposed by the new tariffs, have the reduced rate, and as the carload is an increasing quantity really meaning any specified tonnage upon which the railroads may wish to insist, and as the newer cars have a capacity of 40,000, 50,000, and sometimes 60,000 pounds, the tendency is to make the arbitrary limit of a carload increasingly large, so that next year it may be advanced by the railroads from 24,000 pounds to twice that quantity, as it has just been advanced from 20,000 to 24,000 pounds, and may possibly be made ultimately as large as what constituted a trainload in the early history of railroading.

The railroad piers and stations in New York and all large cities receive large quantities of merchandise which individually are less than 24,000 pounds, but which bunched and loaded into cars to their full capacity make up full carloads, so that without any additional expense the railroad people get from such cars so loaded to their full capacity, on which the highest possible less than carload rate is charged, three times the revenue which they receive from carloads loaded with one kind of freight which go at carload rates. This is a gross wrong to the small shippers whose freight is so bunched and loaded, and who are, therefore, equitably entitled to the benefit of any such economies in transportation.

The testimony of the witnesses for the railroads in these cases fails to justify these differences, the witnesses, however, disagreeing among themselves as to the reason of such differences. The theory of difference in the cost of service was one of the main reasons advanced by the witnesses for the railroads in defense of the present rates, but it was shown that this cost bears no relation to the difference in the rate, and indeed in this regard the whole tariff seemed to be arranged by "rule of thumb," no definite principle being discovered.

It was shown in the testimony that the difference in the rate of freight charges in the case of most of these articles equals or exceeds the jobber's net profit, so that such a freight rate practically prohibits sales of these goods at the seaboard and shipments West-bound in the smaller quantities.

The result of the present classification is, therefore, that the retail grocer throughout the country is restricted in his buying to his own home market; the lack of competition resulting therefrom increases the prices he has to pay and decreases the quality of his goods, so that the consumers, who are the customers of the retail grocer, and the majority of whom are included in what is known as the laboring class, must, if the present state of things becomes permanent, pay higher prices for poorer goods.

The Tube and Pipe Makers.

Their Argument Before the Senate Finance Committee.

On the 24th ult. William J. Curtis, of the law firm of Sullivan & Cromwell, appeared before the Finance Committee of the Senate as the representative of the following tube and pipe manufacturers of the United States:

Haxton Steam Heater Company, Kewanee, Ill.; Crane Bros. Mfg. Company, Chicago, Ill.; A. M. Byers & Co., Pittsburgh, Pa.; Chester Pipe and Tube Company, Chester, Pa.; Continental Tube Works, Limited, Pittsburgh, Pa.; Conshohocken Tube Company, Conshohocken, Pa.; the Allison Mfg. Company, Philadelphia, Pa.; James Hooven & Sons, Norristown, Pa.; Morris Tasker & Co. (Incorporated), Philadelphia, Pa.; Pennsylvania Tube Works, Pittsburgh, Pa.; American Tube and Iron Company, Middletown, Pa.; Pittsburgh Tube Company, Pittsburgh, Pa.; Reading Iron Works, Philadelphia, Pa.; Spang, Chalfant & Co., Pittsburgh, Pa.; Syracuse Tube Company, Syracuse, N. Y.; Duquesne Tube Company, Pittsburgh, Pa.; Oil City Tube Company, Oil City, Pa.; Riverside Iron Works, Wheeling, W. Va.; Curtis & Co., Syracuse, N. Y.; National Tube Works, McKeesport, Pa.

He presented the following argument, the petition having been prepared under the supervision of Mr. Converse, of the National Tube Works:

To the honorable the members of the Senate Committee on Finance: GENTLEMEN.—The manufacturers of wrought iron and steel tubes and pipes in the United States beg leave to request a revision of the tariff affecting their manufactures as established by the Mills bill, and to ask also for a new classification of their products. The proposed change will read as follows:

I. Plain-end boiler tubes, flues or stays, of wrought iron or steel, of diameters of (outside measurement) $2\frac{1}{2}$ inches or less, 8 cents per pound.

II. Plain-end boiler tubes or flues or stays, of wrought iron or steel, of diameters of (outside measurement) over $2\frac{1}{2}$ inches, $2\frac{1}{2}$ cents per pound.

III. Gas, water and steam tubes and all other classes and kinds of wrought iron or

steel tubular goods having threaded, flanged or socketed ends (permanent or detached) 2 cents per pound.

IV. All tubular goods having plain ends—i. e., no threads, screws, sockets or flanges shall be included in Classes I and II.

We shall justify the proposed duties by calling your attention briefly to the growth, magnitude and importance of the industry we represent.

Ten years ago there were only eight mills manufacturing wrought-iron pipe in the United States, and these were located in the States of New Jersey, Pennsylvania and Illinois. Under the fostering care of the American system of protection the industry has increased in the last 10 years from eight mills to thirty, scattered through eight States. The annual value of the product in 1878 was from \$15,000,000 to \$20,000,000, and from 6000 to 8000 hands (men and boys) were employed. To-day the value of the output is from \$30,000,000 to \$40,000,000, and the number of laborers engaged from 12,000 to 16,000. It will therefore be seen that there has been a growth of 100 per cent. in value of product during the last decade, due, as we claim, to the protection afforded, and this without injury to the consumer, as we shall hereafter show.

During this period there has been a growing demand for wrought-iron and steel tubes and pipes, caused by the growth of the country, the development of other manufacturing interests, and the creation and discovery of new enterprises, notably natural gas supply companies and oil wells. This active demand stimulated the manufacturers to increase their capacity, and while new mills have been erected they do not alone indicate the growth caused by extension and enlargement of old plants. At the present time the capacity of working mills is about one-half the whole amount, 15 mills being idle, having been closed because of too active competition, the business proving for the time being unprofitable. Since January, 1888, there have been two failures, besides the suspension of operations of three other large concerns. Even now, with 15 mills running, the capacity to produce is from 20 per cent. to 40 per cent. in excess of the present demand. This industry is very wide-spread in its usefulness, as the output of the mills enters into various manufactures and trades, such as locomotives and steam boilers of all kinds, gas and water mains, buildings and nearly all classes of construction work. The amount of capital invested may fairly be estimated at not less than \$15,000,000, involving a payment to laborers of not less than \$4,500,000 to \$6,100,000 annually. This capital is, of course, subject to all the influences of like investments, such as wear and tear, fluctuation in prices of raw material, and active home competition, and was embarked in the various enterprises in expectation of all these influences and conditions. The ordinary risks of business have been anticipated, and the manufacturers have confidently relied upon a reasonably stable governmental tariff policy, but they have not expected to be menaced by the dangers of foreign competition induced by a too radical change of the tariff.

The existing tariff has furnished substantial protection from foreign competition, the home demand being almost entirely supplied by home manufacturers. The class of goods in question are manufactured outside of this country, principally in Great Britain and Germany, which countries have an advantage of nearly 100 per cent. in cost of material and about 40 per cent. in cost of labor. This statement is very conservative, as it is based upon a comparison with the cost of labor and materials in Great Britain, whereas in Germany labor and materials are even lower than in Great Britain. Persons well informed in

the trade are bold enough to affirm that the time is not far distant when English manufacturers will be seeking protection against German importations.

Of the 16,000 laborers employed in this country about 75 per cent. can be classed as skilled labor. Many of the more skillful have been trained in their work from boyhood, and have acquired sufficient means to obtain comfortable homes. They are unfitted for any other trade or employment, and if, by reason of any diminution in the demand they were forced to become idle, great and serious results would flow to them and bring disaster and ruin to many happy and contented homes—a condition that could not be cured by seeking other occupations for which they are unfitted and unable to prepare themselves owing to want of skill and adaptability and local and family ties.

Notwithstanding the protection received, the result has not been injurious to the consumer. This fact is conclusively proved by the fluctuation in prices of pipes and tubes, which have varied according to the natural influences of trade. The excess of capacity over the demand, and the absence of any combination, pool or trust have stimulated manufacturers to excel each other in the cheapness of their goods and have caused a healthy rivalry in business, the benefit of which has been enjoyed by the consumer. This condition is likely to continue, as any increased demand would stimulate production, cause the silent mills to renew work and thus counteract the rise in prices.

Another and most important result of the protection hitherto enjoyed has been in the superior class of goods made in this country. The character of goods made in Great Britain, where most foreign pipes and tubes are produced, is inferior to our own, both in their crude and manufactured state. While the English make three distinct grades of goods for gas, water and steam purposes, grading the thickness, quality and perfection of workmanship according to the tests to which these goods are to be subjected in actual use, we manufacture one class, suitable for gas, steam and water; and, while it is true that our factor of safety, where goods are used for gas, is very much larger than necessity calls for, the consumer and the public derive the advantage of this precaution. It would, therefore, result in great injury to the public to mix the different classes of goods, either through the designs of dishonest merchants or the carelessness of purchasers. A change of system so long and so favorably established and known would bring chaos and confusion to the trade, as well as loss and danger to consumers. The English and Germans are noted for cheapness and the Americans for quality. It may be said that the superior quality of our pipes and tubes would afford some protection to our manufacturers and keep their rivals out of this market; but it is a well-known fact that advantage in price is a greater danger than advantage in quality is a protection. It will, therefore, be seen that protection benefits instead of injuring the consuming in quality.

Any demoralization of the pipe and tube trade in this country will react upon other industries. With us, as with almost all other trades and arts, there are many supplying materials, &c., with which we work. One of the mills represented by us (the National Tube Works Company) itself manufactures from 50,000 to 60,000 tons of iron and steel by three or four different processes, all of which is consumed in its own mill. This company employs in this branch of its business alone 2000 workmen. It also purchases as much more material from other rolling mills and forges. While all rolling mills and forges are not dependent upon the trade we represent

for their business, the strips of steel and iron used in pipe-making are of special form and size, and rolling mills are now engaged making this specialty alone, producing at least 500,000 tons annually, and employing about 22,000 workmen. We might follow the chain further back and consider the number of steel ingots, blooms, and the amount of pig-iron necessary to supply these rolling mills, but our purpose will have been accomplished if we have directed your attention to the intimate relation one branch of trade bears to another, and to the great injury that would result from crippling the manufacture of one line of goods, which in itself, as compared with the great total of iron and steel production, is comparatively insignificant; but when considered in the light of its effect upon trade and upon business, supplies the difference between success and failure. These interests are all kindred, and what affects one is sure to affect the other. A serious disturbance of the present relation must, therefore, injure many workmen and impair many millions of capital. The closing of all the pipe and tube mills and kindred rolling mills in this country, could such a contingency arise, would cause at least \$100,000,000 of capital and 100,000 workmen to lie dormant and be idle.

The proposed tariff and classification differ from those in the existing law, those in the bill now before you, and your own suggestions as they have been conveyed to us. A frank consideration of the necessities of the case has warranted a revision and a substantial reduction provided the classification can also be adopted. The language used is justified by experience, as the present tariff can be, and, as we believe, is, being evaded by importers. For the purposes of ready comparison we copy the various provisions:

Present Tariff.—"Boiler tubes, or flues or stays of wrought iron or steel, 3 cents per pound.

"Other wrought iron or steel tubes or pipes, 2½ cents per pound."

Mills Bill.—"Boiler tubes or other tubes or flues or stays of wrought iron or steel, 1½ cents per pound." (Page 18, lines 247, 248.)

Proposed Senate Bill.—"Boiler tubes or other tubes or flues or stays of wrought iron or steel, 2½ cents per pound."

Our Classification.—I. Plain-end boiler tubes, flues or stays of wrought iron or steel, of diameters of (outside measurement) 2½ inches or less, 3 cents per pound.

II. Plain-end boiler tubes or flues or stays of wrought iron or steel, of diameters of (outside measurement) over 2½ inches, 2½ cents per pound.

III. Gas, water and steam tubes and all other classes and kinds of wrought iron or steel tubular goods having threaded, flanged or socketed ends (permanent or detached), 2 cents per pound.

IV. All tubular goods having plain ends, i. e., no threads, screws, sockets or flanges shall be included in Classes I and II.

It will be readily seen that the recommendation we make has the merit of clearness and simplicity, although somewhat longer than any of the others.

By a curious coincidence the word "pipes" is entirely omitted from the Mills bill, and also from the first section of the existing law.

So quick is the foreign competitor to catch at these significant distinctions that German tubes have been imported and invoiced as pipes, thereby obtaining the advantage of the lower duty, and securing a market for their goods at prices against which it is impossible for our clients to compete.

We have presented these general views for your earnest consideration, without burdening you with a mass of statistics and figures to justify our facts; but should

you crave the confirmation we are prepared to give, and your patience and strength will permit you to peruse them, we will gladly furnish the data collected for the purpose of enabling us to present the views herein expressed. They warrant us in laying down the following propositions:

I. The system of protection in practice during the last ten years has stimulated the growth of the manufacture of wrought iron and steel pipes and tubes.

II. It has protected the home industry without injury to the consumer.

III. Home competition is now so active as to prevent unnatural and artificial prices and exorbitant profits.

IV. The addition of foreign competition would result in disaster to our home mills.

V. We cannot compete with foreign manufacturers.

(a) They have 100 per cent. advantage in the cost of material.

(b) They have at least 45 per cent. advantage in cost of labor.

(c) Their goods are inferior in quality.

VI. The present investments in manufacture were made on the faith of protection and an expectation of reasonable stability of the tariff.

VII. The home consumer has been benefited by a natural fluctuation in prices, and a superior standard of goods.

VIII. A radical change in the tariff would imperil the capital invested and injure the laborers, who must, of necessity, prosper or suffer according to the condition of trade.

These considerations warrant the appeal we submit, and in view of the reasonable concessions made in our recommendation, we confidently hope you will be justified in reporting them in the bill to be proposed by you to the Senate.

Grate Areas for Boilers.

The *Locomotive* directs attention to the fact that one of the greatest mistakes that can be made in designing boilers, and the one that is most frequently made of any, consists in putting in a grate too large for the heating surface of the boiler, so that, with a proper rate of combustion of the fuel, an undue proportion of the heat developed passes off through the chimney, the heating surface of the boiler being insufficient to permit its transmission to the water. This mistake has been so long and so universally made, and boiler owners have so often had to run slow fires under their boilers to save themselves from bankruptcy, that it has given rise to the saying, "Slow combustion is necessary for economy." This saying is considered an axiom, and is regarded with great veneration by many, when the fact is, if the truth must be told, it has been brought about by the wastefulness entailed by boiler plants proportioned badly by ignorant boiler-makers and ignorant engineers. Direct experiments have been made to settle the question. The grate under a certain boiler was tried at different sizes with the follow result:

With grate 6 feet long ratio of grate to heating surface was 1 to 24.4.

With grate 4 feet long ratio of grate to heating surface was 36."

The use of the smaller grate gave, with different fuels and all the various methods of firing, an average economy 9 per cent. above the larger one, and when compared by burning the same amount of coal per hour on each, 12 per cent. greater rapidity of evaporation and economy were obtained with the smaller grate.

The *Ironmonger* prints the following: "An example of the serious manner in which trade is hampered by high railway rates has just come under our notice, and may be mentioned in order to encourage

the movement which is in progress for securing improved water communication for certain of our inland districts. A firm in mid-England purchased in the United States 600 tons of American charcoal pig iron. That iron was produced at Elk Rapids, Mich., a place, as most of our readers are aware, several hundred miles west of New York. The iron was shipped to Liverpool at a freight rate of under 16/ per ton, including all dock and other dues in the United States. The distance thus covered was about 3800 miles, so that the freight charge was extremely favorable. The dock dues in Liverpool and the railway rate from Liverpool to the consignee's sidings, a distance of 80 miles, amounted to 11/ per ton, a charge which compares most unfavorably with the ocean freight."

The World's Wheat Supply.

According to a recent review in *Bradstreet's*, the world as a whole has wheat sufficient for the world's consumption in 1888-9, but on a higher plane of prices. The price may become speculative, may be carried too high, higher than the situation warrants, in which cases there will be reactions. From the information in hand it appears true that wheat supplies will be so much smaller than usual and that the reserves will be so much depleted as to warrant an advance in values. The higher freights ruling will be a factor in bringing about this result.

Europe's Wheat Requirements and Supplies.

	Bushels.
United Kingdom.....	155,000,000
France, probably.....	75,000,000
Spain and Portugal.....	10,000,000
Switzerland.....	10,000,000
Italy.....	20,000,000
Belgium.....	16,000,000
Holland.....	7,000,000
Sweden.....	1,000,000
Germany.....	18,000,006
Greece.....	5,000,000

The total will reach.....331,000,000

Russia will probably supply.....	90,000,000
Austria-Hungary.....	12,000,000
Egypt.....	3,000,000
Algeria.....	2,000,000
Denmark.....	30,000,000
Turkey, Roumania, &c.....	5,000,000
Persia.....	90,000,000
United States.....	4,000,000
Chili.....	8,000,000
Argentine Republic.....	10,000,000
British North America.....	18,000,000
Australia.....	35,000,000
British India.....	305,000,000

Apparent deficiency.....26,000,000

But these estimates, both supplies and requirements, may need considerable modification. Any very considerable advance in the price would necessarily diminish consumption, as greater economy would be exercised, which would leave no real deficiency. It may be safely stated that there will be no wheat famine in the world during 1888-89.

The first full cargo of iron ever shipped north, says the *Atlanta Constitution*, was carried out last Thursday from Savannah, loaded for Philadelphia, on the new freight steamship City of Birmingham, of the Ocean Steamship Line. The iron came from Birmingham, via the Central Railroad of Georgia, and indicates the growth of the new industry in the South. The cargo consisted of 121 car loads, or 2079 tons of pig metal, and the steamer went out drawing 16 feet 8 inches mean draft. After discharging her cargo at Philadelphia the Birmingham will go to New York and load railroad iron for Savannah. While large quantities of pig iron have been going East via the Central Railroad and its ocean steamers from Savannah, this is the first full cargo that has ever gone from any Southern port.

THE WEEK.

The President has designated Lieutenant Jacob J. Hunker, United States Navy, as Supervisor of the Harbor of New York. He is to act under the direction of the Secretary of War in enforcing the provisions of the act to prevent obstruction and injurious deposits within the harbor and adjacent waters of New York City by dumping or otherwise, and he is to detect all offenders against this act. He is to direct the patrol boats and other means to detect and bring to punishment offenders against the provisions of the act.

Chairman Blanchard, of the Central Traffic Association at Chicago, pronounces the new Pacific Coast rates, which took effect September 1, unfair, and he advises shippers in the transcontinental trade to appeal to the Interstate law. Mr. Blanchard stated that he would not accept them, neither would the Eastern trunk lines. He didn't think the California roads had any right to make a lower rate from New York to San Francisco than from an intermediate point like Pittsburgh. These lines fall back on the winter clause of the Interstate law, and claim that under this act they are justified in making these unfair rates. As it is now, the Pittsburgh iron manufacturer, in shipping to the Pacific Coast, will find it cheaper by far to send his iron to New York and have it returned from there. The California lines say they will not withdraw the tariff, and Mr. Blanchard said the only way to settle the difficulty is to appeal to the Interstate Commission. He also thought that the Interstate commissioners should have more authority. The law is merely advisory at present, and the railroads cannot be forced to obey it. He believed certain changes should be made which would give the commission the authority to coerce the roads into obeying the letter and injunctions of the laws laid down by the Senate. He said further that the business done by the roads so far this year does not compare with the traffic handled in 1887.

The New York Corporation Council pronounces the law void which was passed by the last Legislature creating an office for the weighing of coal, being in violation of article 5 section 8 of the Constitution, which says: "All offices for the weighing * * * any commodity whatever are hereby abolished, and no such offices shall hereafter be created by law."

An English resident of Ecuador is about to establish a fortnightly steamship service, under Colombian colors, between Chilean ports and Panama, and the United States Consul-General at Panama believes it will be successful.

Three eminent Chinese engineers at New Orleans are examining the jetty system and are to decide whether it can be used advantageously in deeping the mouths of the Yellow River.

Charles H. Lichman resigned the general secretaryship of the Knights of Labor.

Jacob Souder, a prominent coal operator at Pottsville, and for many years sales agent of the Reading Company, was killed between the bumpers of the cars at Crystal Colliery on Friday last.

The contract for putting the city Fire Department wires underground was awarded to the Standard Underground Cable Company. The contract calls for an expenditure of \$47,717.25.

The advocates of the proposed East River tunnel are urgently pushing their scheme before the New York Board of Aldermen. The tunnel under the city streets would run through Thirty-eighth street from the East to the North River, with lateral branches connecting with the

New York Central and Hudson River Railroads. Everett P. Wheeler, representing the Long Island Railroad Company, said the tunnel will be 5 miles long, and will pay to the city in taxes \$50,000 a year. There will be an opening to the tunnel at every block, and access will be had to it by a system of commodious elevators. It is not proposed to run locomotives in the tunnel, but to use either electricity or cable as a motive power.

It is reported that the importers of tropical fruit have organized a trust in New Orleans. Six houses are in the combination, representing a total capital of \$10,000,000. It is said \$6,000,000 have been advanced by London parties to build railroads in Central America and concentrate the trade at selected ports.

Jute bagging as a covering for cotton bales has been considered indispensable, but a combination of the manufacturers to advance the price is resolutely resisted by cotton planters, and to such an extent that deliveries at shipping ports may be seriously delayed. The question excites deep interest on the New York Exchange, the legality of any substitute for jute bagging under the regular delivery contract being questioned. In New Orleans, according to one of the local papers, "the suggestion to use cotton cloth as a substitute for jute and hemp in covering bales of cotton appears eminently practical and wise from every point of view," but in some instances difficulty is encountered in effecting fire insurance.

The Contract Labor Committee authorized by Congress will resume its investigations about November 1, but the testimony already taken is voluminous, and, according to Representative Ford, has convinced the committee that something positive must be done. The laws relating to contract labor have been violated to an alarming extent because of the lack of machinery to enforce them. Italy is flooded with steamship agents who make false statements to induce emigration. One of the facts brought to light incidentally was that naturalization papers are being issued fraudulently to an alarming extent. It is very easy to get out these papers under our law; any one having access to the seal of a court can get them out and sell them. Another fact developed was that the New England fishermen are aliens to the extent of 75 per cent. As to the remedy, the committee have not agreed upon the form it shall take.

The annual report of the Commissioner of Pensions shows that the amount expended for and on account of pensions during the year ending June 30, 1888, was nearly 31 per cent. of the entire disbursements of the general Government. The amount of pensions paid during the year was \$78,775,862, an increase over the previous year of \$5,308,280. The total amount disbursed by pension agents for all purposes was \$79,646,146. The cost attending such disbursements was in the aggregate \$3,262,524, it being a fraction less than 4 per cent. of the total expenditures of the Bureau. The total amount expended for all purposes was \$82,038,386, being 21 1/2 per cent. of the total estimated gross income of the United States Government for the period.

Mr. Jenner, of the British Legation, Buenos Ayres, in a recent report on the finances of the Argentine Republic and on the last Presidential message, states that the country is in a more prosperous condition than it has ever been before. As compared with 1886, almost every branch of industry and commerce showed an important increase in 1887. The total value of imports and exports rose from \$194,000,000 to \$218,000,000, and the first quarter of the current year shows an increase of \$4,000,000 over the same portion

of 1887. The number of vessels entered and cleared increased by 4000, with an increased measurement of 1,000,000 tons. The revenue in 1886 was \$46,762,000, while in 1887 it rose to \$58,135,000, and the excess of revenue over expenditure was \$6,217,000. The floating debt has been reduced by \$5,000,000, and about \$3,500,000 of Treasury bonds have been paid off. The credit of the Government with European banks is maintained by the deposit of a large number of shares of the Central Argentine Railway, but the President proposes to sell half of these, the remainder being sufficient to maintain the Government credit account in Europe. The external debt amounts to \$92,427,000, which the President calculates can be paid off in eight years. The Argentine credit, as shown by the quotations of the national bonds in the London market, is higher than it has ever been before.

In England, as in the United States, there is an increased demand for tonnage to be employed in the transportation of grain, so that shipowners are fast recuperating their weakened resources. A London circular relating to steamship tonnage says a large number of orders for new steamers have been given out, and several laid down on the strength of an expected further demand. Prices asked and obtained show about 5 to 15 per cent. advance on the lowest points touched, according to dates of delivery.

Judge Fairall has filed his opinion in the Iowa railway cases against the Iowa Railroad Commission, and in the test suit of the Chicago, Rock Island and Pacific Railway against the Commission, sustaining the injunction against the commission at all points, and quoting authorities to sustain his position. The Judge holds that the court has jurisdiction over the commission, and says that while the commissioners have discretionary power to fix rates, yet when they fix them so low that the earnings are thereby diminished to such a point that the company is unable to pay its fixed charges and operating expenses, then their act contravenes the spirit of the statute and is in violation of the constitutional right of the common carrier to a just and reasonable compensation and reward for his services. When the rates are not compensatory a court of equity has the authority to intervene. The Iowa Railroad appeal from Judge Fairall's decision will be heard at the October term of Court.

A retired iron manufacturer of Pennsylvania, Thomas Beaver, uncle of the Governor of the State, has erected and presented to the town of Danville, 50 miles from Harrisburg, a noble building called the Thomas Beaver Free Library. It was in Danville that the donor amassed his wealth in iron, and the institution stands as evidence of his regard for the people. The gift amounts to \$150,000. Of this sum about \$100,000 has been spent in the purchase of the ground and the erection of the building, \$10,000 has been used at once in purchasing books and \$40,000 of securities are given to the trustees as a permanent endowment fund.

The California vintage for 1888, as estimated by the secretary of the State commissioners, is 20,980,000 gallons, Napa and Los Angeles counties leading off with 3,500,000 gallons each. The raisin production is placed at 1,000,000 boxes or more.

Chief Arthur, of the Locomotive Engineers, on several public occasions lately has referred to the disastrous strike on the Chicago, Burlington and Quincy Railroad, and, at Pittsburgh, made a speech in which he said: "We are ready to submit the case to the arbitration of any three railroad managers in the country." Respecting the dynamite trial, he does "not

hold the Brotherhood responsible for a few weak men, whose actions were unauthorized," but there were "extenuating circumstances which trial will reveal." Mr. Arthur says the Brotherhood has a membership of 25,000 men and the firemen almost as many. He claims that morally and financially the Brotherhood has made great advances since it was organized, 25 years ago, when engineers got \$90 per month; firemen, \$30 per month; freight conductors, \$40 per month; freight brakemen, \$25 per month and passenger conductors, \$60 per month. To-day engineers get \$3.50 per run of 100 miles. Firemen get from 50 to 60 per cent. of that amount, and brakemen get \$4 per day.

Wm. Cramp recommends that the large war ships be built in dry docks and gives for his reason that they are too heavy to be built on stocks and that the risk of launching them without injury is very great. The dry dock now in course of construction at Newport News will be completed some time next month. Work on the Brooklyn and Norfolk docks is progressing rapidly.

The monthly chart just issued by the Hydrographic Office, at Washington, says in reference to the general understanding that now prevails among practical navigators respecting the northern and southern limits prescribed for steamers bound east or west in the Atlantic trade, that "this recent disaster would not have occurred had the Geiser been further to the southward, as recommended for eastward bound vessels, and the collision thus emphasizes the importance of this matter not only to owners, agents, masters and marine underwriters, but to the public generally."

The receipts of flour and grain at Buffalo by lake for the month of August aggregate 17,079,000 bushels, and for the navigation season 55,760,000 bushels. The railroad shipments to the East of grain received by lake are unusually large this season and aggregate 18,073,000 bushels to 19,711,000 bushels by canal.

The bow of the Thingvalla, which arrived at Halifax after her collision with the Geiser, is gone clean down to the keel, and from the collision bulkhead forward she must be built anew.

A Sugar Bounties Convention was held in London, August 30, at which nearly all the principal sugar-growing countries were represented, and the several delegates affixed their signatures to a document providing for the abolition of bounties for the manufacture and exportation of sugar. England agrees not to impose differential duties on cane and beet imports from the countries party to the convention. The countries signing the convention will exclude refined sugar, molasses and glucose coming from countries that have not signed the convention. The parties to the convention may be exempted from its operations by giving a year's notice, under certain conditions. The convention goes into operation September 1, 1891, and remains in force ten years. The trade in this city regard the negotiations as unlikely to result in any change affecting the American market.

The great trunk-line pool, of which Albert Fink is Commissioner, is reported to be so badly demoralized that its dissolution is probable, every effort to "fix up things" having proved futile. "Every line," we are told, "is making its own freight rates to all points; every passenger agent signs an agreement one day, only to break it the next, and when caught by one of Mr. Pierson's detectives the agent is called before the commissioner and asked for an explanation, whereupon a promise is made to reform, and the irregularities are continued." The further statement is made that "the Pennsyl-

vania is about to withdraw from the entire association unless it is abolished by mutual consent. Neither the Erie nor the Baltimore and Ohio pretends to live up to its agreements, and the managers of both agree that the present association is incapable. Every one is dissatisfied, and nearly all are in favor of saving the vast expense of the office, nearly or quite \$200,000 per year, and which, it is regretfully admitted, has not by any means succeeded in accomplishing its purposes. As yet there has been no positive course outlined so far as can be learned, but there is no doubt whatever as to the fact."

The annual report of Hon. Nicholas M. Bell, Superintendent of Foreign Mails, shows that of the Transatlantic mails dispatched in 1888 from this country 43 per cent. of letters and of postal cards and 51 per cent. of other articles went to Great Britain. Germany is next, with 21½ per cent. of letters and 20 per cent. of other articles. Then comes France with 6½ per cent. of letters and 7½ per cent. of other articles, and Sweden with 6½ per cent. of letters and 4 per cent. of other articles. The total number of letters sent from the United States to all foreign countries, including Mexico and Canada by rail, was 43,510,037. The total number of letters received from all countries was 38,451,364. The total cost of the foreign mail service was \$464,910. The estimate for 1890 is \$760,000. The compensation to Transatlantic steamers of foreign lines at the rate of 44 cents per pound of letters and 4½ cents per pound of printed matter was as follows for domestic mails: North German Lloyd, \$174,022.89; Cunard, from New York, \$88,385.17; White Star, \$14,204.76; Liverpool and Great Western, \$28,505.44; Anchor, \$5,094.40; Hamburg-American, \$14,628.76. The mails are awarded on the 15th of each month for the next calendar month to the steamers which show the greatest average speed for three trips immediately preceding the award, and under this system the mails have been materially expedited. With regard to subsidies to American vessels Mr. Bell says: "The policy of dispatching the mails by the fastest steamers tendered has met with so much favor with all classes of people that if at this late day they were deprived of the privilege of dispatching their letters by the quickest possible route it would undoubtedly create much dissatisfaction." The rates of compensation for sea conveyance of mails to foreign countries paid by Great Britain, Germany and the United States to national and foreign steamship companies is shown by the following table:

	To national steamers.		To foreign steamers.	
	Letters, per lb.	Prints, &c., per lb.	Letters, per lb.	Prints, &c., per lb.
Great Britain.....	72¢	6¢	44¢	4½¢
Germany.....	56½¢	4.3¢	44¢	4½¢
United States.....	\$1.00	8¢	44¢	4½¢

The last span in the great bridge across the Hudson River at Poughkeepsie was finished on the 30th ult., and the event was duly celebrated.

The forthcoming annual report of the General Land Commissioner will show that during the last fiscal year there were made 59,095 cash land entries of all classes, aggregating 5,907,254 acres, for which the Government received \$11,203,071. The whole number of entries of all classes, including Indian lands, made during the year was 255,119, embracing 24,485,833 acres. The total receipts from the foregoing were \$13,523,185. Of the whole number of entries 46,236 were original homesteads, embracing 6,676,616 acres; 22,413 were final homestead entries, embracing 3,175,400 acres, and 24,572 were timber culture entries, having an area of 3,733,305 acres. During the year the land grant

railroads made 40,786 selections, embracing 6,525,300 acres. Under school, swamp land and other grants by the Government to the several States and Territories 8029 selections were made, covering an area of 1,265,452 acres. In addition to the 24,485,833 acres entered under the various public land laws during the year the area of commuted homesteads, final desert entries, final homesteads, and final timber culture entries aggregated 5,647,543 acres.

Labor Day was more generally observed in this city and in many other large cities than on previous like occasions. In New York the number actually in the public parade is variously estimated at from 3000 to 8500. The building trades were not so well represented, but of slate and metal roofers there were some 500, and of journeymen horseshoers there were 350 in leather aprons. The tin and sheet-iron workers were also in good numbers, and a steam drill in operation attracted much attention. At Troy, where the iron mills were closed, also in Albany, Boston, Cincinnati, Buffalo, Newark, St. Louis and other points, there were large processions. At Cleveland the iron molders forcibly pulled down a red flag, causing much tumult, and in this city one arrest was made for distributing anarchist circulars; otherwise good order was preserved.

St. Louis is to have a new union railroad depot, to cost \$500,000.

An actual beginning has been made in clearing New York City of dead wires and dead poles. As a substitute the Fire Department has already contracted for cables to enable it to avail itself of the underground service, and the Brush Electric Light Company are drawing their first cable into the Broadway conduits, while the East River Electric Light Company have ordered an underground cable which is to be ready within ten days. Of the 1700 lines of wire entering the Central Telegraph Station in London not one is above ground.

It is now estimated that the new library building in Washington City, if built in accordance with the plans adopted, will cost \$10,000,000, so that all calculations heretofore made are thrown into confusion.

It is charged that millions of feet of Canadian lumber are smuggled into the United States free of duty. A letter from Calais, Maine, says: "The St. Croix River, with its source in the timber lands of Maine, forms a natural waterway from the logging camps to the mills. Further north the St. John River is used for the same purpose, though on the latter the logs are to a great extent manufactured in the interior of New Brunswick and shipped via St. John. The logs floated down the St. Croix are manufactured into lumber at the mills along its banks, of which a majority are situated on the Canadian side. These mills, at Frederickton, Edmonston, Woodstock, Deer Lake, Benton and Magaguadavic, all in New Brunswick, and a number of others near Calais, approachable only from the Canadian side, are the stations for the vast amount of lumber that has been illegally entered free of duty at Calais. During the last quarter of the fiscal year ending June 30, 1886, of a total of over 6,000,000 feet of lumber entered at the port of Calais, over 3,000,000 feet were admitted to free entry as original product of American forests."

Ten large business houses in Baltimore were destroyed by fire on Tuesday morning. Among those burned out were the hardware merchants H. S. King & Sons and Tabb Brothers & Dimmock, whose losses respectively are estimated at from \$40,000 to \$45,000.

MANUFACTURING.

Iron and Steel.

Recently the report has been extensively published that the Jackson Iron Company, of Fayette, Mich., were considering the advisability of removing their furnace plant from its present location, in order to secure better facilities for obtaining fuel. We are authoritatively advised that there is no truth in the rumor whatever. The company are making extensive improvements to their plant at the above place, with the intention of considerably enlarging their capacity for the manufacture of charcoal pig iron. They have no intentions whatever of moving from their present location.

The plant of the Stewart Iron Company, Limited, at Sharon, Pa., which has been idle for some time, resumed operations in full on Monday, the 3d inst., for the manufacture of steel blooms, with 13 puddling furnaces in operation. Employment was given to about 40 hands.

All departments of the Atlantic Iron Works of P. L. Kimberly & Co., Limited, at Sharon, Pa., are now in full operation, with the exception of the bar mill. Employment is given to a large number of hands.

Winona Furnace, of the Columbus and Hocking Coal and Iron Company, in the Hocking Valley, Ohio, which has been undergoing repairs for some time, has resumed operations again.

Steel rails weighing 90 pounds per yard have recently been rolled in the rail mill of the Bethlehem Iron Company, at Bethlehem, Pa., for use on the Philadelphia and Reading Railroad.

The Bellaire Nail Works, at Bellaire, Ohio, are running full in all departments, except the nail factory, which is still idle. Some embarrassment has occurred by shortage in gas, but nothing serious, as the appliances for using coal were not discarded when gas was put in. The blast furnace is making its usual output.

Frankstown Furnace, at Frankstown, Pa., operated under lease by James Pierpont, has been levied on by the sheriff on executions issued by G. W. Jackson & Co., J. R. Reynolds and W. F. Reynolds. The furnace has been in operation about two years, and was making about 20 tons per day.

A press dispatch from Youngstown, Ohio, under date of the 28th ult., reads as follows: "J. N. Whitman, of Syracuse, N. Y., the owner of a patent process for rolling hoop iron, is here negotiating with local capitalists in regard to erecting a mill for the manufacture of his specialty. His process, by which hoop iron can be rolled to any desirable length, and automatically rolled instead of bundled, has been tested at the Warren Rolling Mills and has proven satisfactory. It is likely that a mill will be established here."

Mill No. 2, of the A. French Spring Company, Limited, at Pittsburgh, which was recently damaged by fire, is again in operation, the repairs having been made.

The second furnace of the De Bardeleben Coal and Iron Company, at Bessemer, Ala., is to blow in at an early date.

Moorhead, Brother & Co., of Pittsburgh, proprietors of the Vesuvius Iron and Nail Works, located at Sharpsburgh, Pa., are adding a new heating furnace to their plant, which is an addition to the guide rolls. The motive power, which has heretofore been insufficient, has been increased by another engine, which has just been erected. The present run of the works turns out a greater amount than has ever

been known before, though formerly the mill has been on double turn in every department. Since the new improvements have been added the daily output is about 125 net tons, while the raw product of muck bars is little more than 50 tons a day.

The Belfont Iron Works Company, of Ironton, Ohio, who closed down their plant about two months ago to make extensive repairs, have started up again full time in all departments. During the stoppage one gas-producing furnace and two heating furnaces were added to the plant. They were constructed by Alex. Laughlin & Co., engineers and contractors, of Cleveland, Ohio.

The Gadsden Furnace (coke), at Gadsden, Ala., is to blow in on the 10th inst.

Wm. Clark's Son & Co., proprietors of the Solar Iron Works, at Pittsburgh, are about to place in their puddle department a rotary squeezer of 50 to 60 tons weight, which is to be driven by a reversing engine, so that in case of a "sticker" the ball can be backed out. The machine is being constructed by the Lewis Foundry and Machine Company, Limited, also of Pittsburgh.

It is stated that an effort is being made to start up the plant of the Cartwright Iron and Steel Company, at Steubenville, Ohio, which made an assignment about two months ago. The works were formerly known as the Alikanna Rolling Mill. The unsecured claims amount to \$45,000. Some of the heaviest creditors now propose that the company give long-time notes for 40 per cent. of the indebtedness in full satisfaction of the same, the notes to bear 6 per cent. interest. Then the company will spend \$10,000 in making betterments to the plant and resume operations. The plan is likely to be accepted by the balance of the creditors as a possible means of making good a portion of their claims.

Norway Furnace at Bechtelsville, which went out on the 23d ult., has begun to reline, and will probably start late in October.

Katherine Furnace at Carlisle, Pa., went into blast on the 29th ult.

Some months ago the Carbon Iron Company, of Pittsburgh, secured control of the Fort Pitt Iron and Steel Works, in that city, and have since been busily engaged in making extensive additions and changes at the plant with the object of making the manufacture of structural steel a specialty. Horace W. Lash, formerly with Park Brothers & Co., Limited, of the Black Diamond Steel Works, was secured as general superintendent. Mr. Lash is the inventor of the well-known Lash steel melting furnace. The company have just finished the erection of an open-hearth steel-melting plant consisting of two 15-ton Lash steel melting furnaces, and have commenced the manufacture of steel. They have also put in a large universal mill that was completed on the 1st of September to furnish universal rolled plates 36 inches wide of any length or thickness required for structural purposes. Also slabs from 6 to 30 inches wide, and from 2 to 6 inches thick, and blooms from 4 to 8 inches square. The mill has been run to work down its bearings.

Emma Furnace, of the Union Rolling Mill Company, Cleveland, Ohio, was blown in on the 30th ult.

Crafts Furnace, at Greendale, Ohio, one of the furnaces of the Columbus and Hocking Coal and Iron Company, has blown in.

The extensive improvements now being made to the Soho Furnace of the Moorhead-McCleane Company, at Pittsburgh, are rapidly approaching completion, and

when finished the furnace will have a capacity almost double what it was before the improvements were commenced. The bosh has been increased from 16 to 19 feet, and height of stack from 65 to nearly 90 feet. Along with the increase in diameter and height, the further improvement of fire-brick stoves in the place of cast-iron stoves has been made, and other changes of minor character, but so many of them as will in the aggregate add greatly to the convenience and economy of operating. It is expected that the furnace will be ready to commence operations about October 1, next.

Fannie Furnace, operated by J. C. Hamilton, Shawnee, Ohio, trustee, will resume operations in a few weeks. A new bosh has been put in, general repairs have been made, and a new brick casting house, 37 x 85 feet, is being put up to replace the old one recently destroyed by a wind storm.

Walton Furnace, charcoal, at Max Meadows, Va., one of the plant of the Lobdell Car-Wheel Company, of Wilmington, Del., was blown in on September 1.

Machinery.

At the recent sale of the assets of the Smith, Beggs & Ranken Machine Company, of St. Louis, John D. Ranken, a member of the firm, purchased the realty, buildings, tools and patterns for a sum slightly exceeding \$63,000. Stock, finished and partly finished, and other minor assets, will be sold later on.

Eynon & Marshall, engine builders and machinists, of Cleveland, Ohio, are receiving numerous orders for their slab-milling machine. On account of an increase of orders the company have been compelled to erect a new factory, which they expect to occupy in November next.

The American Manufacturing, Mining and Milling Company, of Cleveland, Ohio, have just completed the erection of a 50-ton crushing and concentrating plant for the Humboldt Mining Company, at Lordsburg, New Mexico.

P. F. Goode, proprietor of the American Nail Machine Company, at Ashtabula, Ohio, has signed a contract for the removal of his establishment to Findlay, Ohio, and has already let the contracts for the new buildings, which are to be large and commodious and will be completed in November next. When completed the new works will give employment to about 150 skilled workmen.

The Oakland Iron Works have been incorporated, at Oakland, Cal., with a capital stock of \$50,000, to manufacture machinery, milling supplies and foundry work of all kinds. The directors are George Cottrell, T. L. Armstrong, Edward Clark and others.

Messrs. Curtis & Curtis, of Bridgeport, Conn., manufacturers of the Forbes patent die stock, pipe cutting and threading machinery, are still running overtime in their new works. Their July shipments were the largest of any month since they have been in business, but they overran even this in August, when the shipments exceeded those of July by over \$500. They are particularly busy filling orders for their power pipe machines, among which are orders from South Africa, Texas, Montana and San Francisco.

The Cleveland Twist Drill Company's new works are progressing rapidly. They expect to get into the buildings on November 1. The main building is 100 x 40 feet, with tempering and forge shops adjoining. New machinery will be added to keep up with increase in business.

Messrs. Lodge, Davis & Co., Cincinnati, Ohio, expect to have the addition, now being erected, to their plant fully com-

pleted by September 15, when they will have 6000 square feet of floor surface devoted to manufacturing purposes. Their business has more than doubled in volume within the past few years. August was the largest in point of business in the history of the establishment.

Hardware.

The Iron City Chain Works, of James McKay & Co., on Twenty-ninth street, Pittsburgh, resumed operations on Monday, the 27th ult., after a stoppage of nearly two months, to make repairs. Orders at this establishment are reported as being rather scarce.

The Baltimore Nail and Screw Company have been incorporated at Baltimore, Md., with a capital stock of \$15,000, to manufacture nails and screws. The incorporators of the new enterprise are Joshua J. Underhill, James T. Armstrong, George C. Galch, William S. Dorman and Jacob S. Barnes.

The Empire Wringer Company, Auburn, N. Y., advise us that while their sales in 1887 were larger than ever before, the sales to July 1 this year show an increase of 25 per cent. over the corresponding period of last year. They have enlarged their facilities somewhat since January 1, but the factory is now closed for necessary repairs, but will start up again with some new machinery and an additional force in a few days.

Miller Lock Company have removed their office and works to Frankford, Philadelphia. The new location is an advantageous one in many respects, more especially in the matter of working space and shipping facilities. The new plant is located on Tacony street, below Orthodox, the dimensions of which are 100 x 200 feet, with two-story factory 50 x 84, and foundry 20 x 40. The company inform us this step was necessary on account of the constantly increasing trade, which often taxed their facilities in the old plant to make seasonable deliveries. With their present capacity they are in a position to readily meet double the demand of the past year.

Miscellaneous.

From the Marquette, Mich., *Mining Journal*, of the 25th inst., we take the following: Lake shipments of iron ore for the week ending with Wednesday, the 15th, amounted to 202,384 gross tons. Of this total 49,564 tons went from Marquette, 82,804 tons from Escanaba, 3138 tons from St. Ignace, 52,076 tons from Ashland, Wis., and 14,802 tons from Two Harbors, Minn. The lake shipments for the season now amount to 2,431,330 gross tons, or within 219,782 tons of the quantity shipped at the corresponding date in 1887. By ranges the shipments are as follows: Marquette range, 950,305 tons; Gogebic range, 711,562 tons; Menominee range, 579,147 tons; Vermillion range, 190,316 tons. The following table shows the shipments by port up to date this season in comparison with the shipments for the corresponding portions of the two preceding years:

Port.	1886.	1887.	1888.
Marquette.....	403,328	499,306	553,488
Escanaba.....	1,172,875	1,232,787	886,397
St. Ignace.....	68,671	55,469	41,689
Ashland, Wis..	597,140	652,018	401,146
Two Harbors,			
Minn.....	190,316	211,442	189,227
Total.....	2,431,330	2,651,112	2,071,947

The Gorham Manufacturing Company, silversmiths, of Providence, R. I., have begun the erection of a monster factory in Elmwood, a western suburb. The big factory will consist of 12 buildings, to be completed a year from next November. There will be a little short of one mile of foundations. The main structure will be 419 x 256 feet, two buildings will be 419 x 225 feet and each will be 44 feet wide and

three stories high. The main preparatory building will be 225 x 80 feet, one story, and here will be carried on the heavy press and drop work. The exhibition room will be 200 x 65 feet and two stories high. The buildings are all to be of brick, with granite and brown stone trimmings. About 1300 hands will be employed.

A press dispatch from Charleston, W. Va., under date of the 28th ult., reads as follows: "The property of the Boone & Raleigh Coke and Coal and Railroad Company, and of the Black Band Iron Company, consisting of 3690 acres of land, was sold to-day to L. B. Russell, of Lynn, Mass., for \$250,000."

The Avonmore Coal and Coke Company, of Pittsburgh, with a capital of \$10,000, were chartered at Harrisburg last week.

The Perry Stove Mfg. Company's works at South Pittsburgh, Tenn., 20 miles west of Chattanooga, are again overtaken by disaster, the boiler having exploded early on Monday morning, September 3. Six men were instantly killed, among whom were Charles Taylor, the superintendent of the works, J. B. Mills, a machinist, M. Donovan, foreman of the mounting department, George N. Carter, a leading jeweler of the town. The boiler and engine were in the corner of the molding room and the whole side of the building was torn away for a distance of 40 feet.

The S. Obermayer Foundry Facings and Supply Mfg. Company, Cincinnati, have again been compelled by reason of their largely increased business to erect an additional structure to their already large plant in the nature of a new ware and storage house, the dimensions of which are 121 by 82 feet. The new structure, when completed, will enable the company to devote more space to the production of their goods.

Two notable buildings are in course of erection in New York. Perhaps the most interesting piece of work now in progress is the office building which J. Noble Stearns is erecting at Nos. 50 and 52 Broadway and Nos. 41 and 43 New street. It will be the highest structure on the same width of ground which has ever been erected. It will be 13 stories in height on Broadway and 15 on New street, and when completed will enjoy the distinction of containing more stories than any other office building in the city, and probably in the country. It will also have the curious reputation of having been built upon a lot which has only a frontage on our greatest business artery of 21.6 feet, while it will be 39.4 on the other side, with a depth of 159.7. The construction is exceptional, the building being carried up to the fifth story with iron, the stories above being of brick. It will be fire-proof throughout, and cost about \$225,000. The architect is Bradford L. Gilbert. The most expensive down-town building in progress is that being erected for the Bank of America, on the northwest corner of Wall and William streets. It is to be nine stories in height, 70 x 80 in size, and perfectly fire-proof. The front will be of stone, the first two stories of granite and the seven floors above of Indiana limestone. The architect, Chas. W. Clinton, estimates that the new structure will cost complete about \$400,000. To the foregoing may be added the *Times* building, fronting City Hall Park, whose lofty arched walls are reaching a conspicuous elevation.

One of the late fast train runs from London to Edinburgh was made in seven hours and fourteen minutes, exclusive of stoppages, at an average speed of 55.4 miles an hour.

NEW PUBLICATIONS.

THE LIXIVIATION OF SILVER ORES WITH HYPOSULPHITE SOLUTIONS. By Carl A. Stetefeldt. Published by the author, 18 Broadway, New York. Price \$5.

The penetration into greater depths of our mining operations in the Rocky Mountains, coupled with the possibility of treating leaner ores, has considerably enlarged the field of the metallurgist, and the old days of the "muscular amalgamator," as Mr. Stetefeldt calls him, are fast passing away. He is being superseded by men who have at their command both theoretical training and practical experience, a class of whom the author has been a pioneer and is still the acknowledged leader in this country. When some years since Mr. E. H. Russell, then connected with the famous Ontario mine of Park City, Utah, discovered that a solution of a double salt of cuprous hyposulphite and sodium hyposulphite acts powerfully as a solvent of silver and its compounds, Mr. Stetefeldt took an active interest in developing the possibilities of what is now known among silver metallurgists as the Russell process. Both the inventor and Mr. Stetefeldt freely published the results of their investigations in contributions printed chiefly in the "Transactions of the American Institute of Mining Engineers." The work was thorough and painstaking, its latest fruits being given to the public in the work before us, which may well serve as a model of special metallurgical treatises.

It would carry us too far to discuss in detail the contents of the book, since the subject is one in which but few of our readers are directly interested. Suffice it to say that Mr. Stetefeldt treats in the first part the chemistry of the process throwing a clear light upon many formerly obscure and neglected points, largely upon the basis of special experimental researches. The second part deals with the practical execution of the process, including a description of plant and appliances, the points to be considered in connection with the solutions, the handling of the ore and the liquors, the precipitation of the metals dissolved and the treatment of the sulphides resulting therefrom. He gives notes on the construction of the plant, its cost and the expenses of running a mill, and, finally, goes into a comparison of the new process as compared with amalgamation as shown by actual results obtained at a number of mills. Mr. Stetefeldt's is a standard work which has met with well-deserved praise by those interested in the metallurgy of silver.

A Winnipeg dispatch reported that the Manitoba Legislature ratified the agreement with the Northern Pacific Railroad by a vote of 26 to 10, five supporters of the Government being among the minority. The main feature of the document is the transfer to Northern Pacific control of the Red River Valley Road from Pembina to Winnipeg, and the extension of 51 miles from Winnipeg, which the Government is now building. The Northern Pacific agree also to build a line from Winnipeg 135 miles northwest to Portage la Prairie, and guarantee a very low maximum rate on freight from Northwestern points to Duluth.

The Island of Cuba, Edgar L. Wake-man says, in a letter to the *Republic*, offers a splendid field for the culture of coffee. One-half of the southern slope of the island is cultivable as the finest coffee lands of the world.

Collector Magone at this port is showing more vigilance in returning paupers to Europe

The Iron Age

New York, Thursday, September 6, 1888.

DAVID WILLIAMS, - - - PUBLISHER AND PROPRIETOR.
 CHAS. KIRCHHOFF, JR., - EDITOR.
 GEO. W. COPE, - - - ASSOCIATE EDITOR, CHICAGO.
 RICHARD R. WILLIAMS, - - - HARDWARE EDITOR.
 JOHN S. KING, - - - BUSINESS MANAGER.

Protection and Progress.

Mr. David Wells, who certainly cannot be fairly suspected of a tendency to underestimate the importance of the tariff question, has shown, in a series of striking articles on the economic disturbances of the past 15 or 20 years, that a cause has been operating, in the presence of which tariffs, currencies, banking systems and economic legislation of all kinds are relatively insignificant—so insignificant, in fact, that it is scarcely possible to detect their effect in the experience of this or that civilized country, during the period named, in modifying the effects of the greater, deeper and more general cause. The one thing that can be declared of the unparalleled economic disturbances of this period is, that they have affected different nations in proportion to their advancement in civilization, as measured by the use of machinery. This fact alone is sufficient to indicate, what is abundantly susceptible of proof in other ways, that this main cause has been the almost revolutionary progress of every branch of industry, and the astonishing reduction of cost in every department of production and exchange. A very large proportion of the invested capital of civilized nations has thus been destroyed, and a very large proportion of their industrial laborers has been forced to change of employment, with the inevitable result of a visible increase of the number who are, at a given moment, temporarily out of employment.

These stupendous changes are the sudden result of a century of invention and preparation. As the rains on the upper tributaries of the Nile, swelling hundreds of streams at once, produce a flood in the main stream that comes on like a tidal wave, so innumerable labor-saving contrivances and scientific discoveries, new applications of steam and electricity, new enterprises like the Suez Canal, new materials like petroleum and natural gas, have combined with well-nigh catastrophic results; and thousands of men, both rich and poor, have had sad experience of the irresistible nature of Progress.

It is not true, as Mr. George insists, that this world-wide force tends to increase poverty. It is not true that of the greater wealth produced the laborer gets less than ever. On the contrary, the manual workers are those who have been most benefited; and it is capital which has suffered the greater loss, and receives, and will continue to receive, a diminished gain. We need not travel again the well-worn road of this demonstration. Starting from the proposition that progress is a good thing, we wish to point out some relations between it and protection, the importance of which has been overlooked; and under the head of protection we include the patent laws and the tariff.

Let it be remembered that this progress which has produced such immense results

in recent years has been general throughout Christendom. Our proposition is, that the patent laws and the protective tariff of this country have been important factors in it. We do not concern ourselves at this time with any other relations of either factor. We do not purpose to discuss them "on their merits." We shall simply indicate facts which ought to be taken into account in such a discussion.

The principal means of the progress we are considering is the interchange of ideas. Free trade in these is worth more, to producer and consumer alike, than free trade in anything else could possibly be. This principle lies at the foundation of patent laws. It is recognized that society will be the gainer if a man who has devised a new and valuable improvement in any art will tell plainly what it is, instead of keeping it as a trade secret, perhaps to die with him. Consequently he is paid for making public what he would otherwise conceal. A monopoly is granted him—a monopoly which is, in this country, more absolute in its nature and longer in its term than in any other. At the end of its period the public inherits the advantage of a free use of his invention. During the period it is directly his interest to explain it, to demonstrate it, to advertise it and to introduce it as widely as possible in practice. This stimulates other inventors in the same line to seek similar rewards. With all the defects in administration which characterize the American patent law, it must be admitted that it has been a chief cause of the extraordinary fertility of invention among us. And the principal reason is that American inventors are so well rewarded and protected that they would rather take the absolute monopoly offered them by our laws for 17 years than try to protect themselves by secrecy. Important trade secrets are rare among us. Everything patentable—in other words, everything new, useful and capable of the necessary precise description—is patented, and so made public. The resulting revenue is poured for a while into the pockets of the monopolist and his grantees, but the intellectual treasure, the contribution and the impulse to progress, is bestowed instantly upon the public. The protection of the patentee against home competition makes him communicative, and this communication of new knowledge is cheaply bought by the community at the price of a monopoly.

Now, the protection against foreign competition afforded by a tariff has a similar effect. The reason that an English ironmaster traveling in this country can obtain easy access to all our great establishments, see anything they contain, watch all their operations and obtain analyses, samples and drawings, while an American in England or on the European Continent finds it hard always, and impossible often, to obtain such facilities, is that our manufacturers do not fear that their improved methods adopted abroad will come back to plague them with competition. Of course the Belgian or British manufacturer has in most cases no fear of direct American competition, and Americans will be admitted if anybody is; but the danger that valuable secrets of practice may thus leak out and get to the knowledge of the enemy is often too important to be trifled with, and hence "No

admittance" is inscribed upon the door. These deficiencies are not due half as much to any national characteristics as to the features of the business situation as determined by international commercial competition. It is often said that if all barriers were removed American ingenuity would enable us to compete on equal terms with foreign rivals. Those who say this overlook two things: First, that to be effective in competition such ingenuity must operate secretly; secondly, that to keep secrets from foreigners we must keep them from each other, and that this would destroy the very atmosphere of free interchange of ideas in which our national ingenuity has been bred. It is not an inherent quality in our blood which must find expression. Foreigners who come among us manifest it speedily enough. As a factor of progress it is the product of our laws, and it may be nullified by changing the conditions which now favor it.

To complete our demonstration it remains to show that the two agencies of protection above named operate internationally to produce and to accelerate progress. If our contention be true, we ought to find not only that within our own country the free interchange of ideas favored by protection has rapidly improved industrial practice, but also that the dissemination of American ideas abroad has been exceptionally free and wide, and has perceptibly affected foreign practice. This we shall undertake to show in another article.

Proposed Restoration of a Central American Union.

The necessity or desirability of reuniting the five Central American republics is so universally felt that a serious effort is to be made this time to bring about the event, and lay down the foundations for a permanent union. With the example of regenerated Mexico at their doors and the Panama Canal work still going on in the neighboring Colombia at the south, and the revival of a Nicaragua Canal scheme, Central Americans feel that the time has come for a strong State to hold the balance of those two nations. The feeling is strengthened, moreover, by the harmony at present existing between the five republics and their respective presidents. Costa Rica has in this instance taken the initiative, and in a month or two a Central American Congress is to assemble at San José de Costa Rica for the purpose of framing the new compact. The first union lasted from July 1, 1823, to 1840. On February 28, 1885, General Barrios, President of Guatemala, issued a proclamation attempting a restoration; finding, however, that there was not the response he counted upon, he invaded Salvador with an army and fell in the first engagement, at San Lorenzo, on April 2. One of his generals, Francisco Menendez, continued the war, and seized the Presidency or rather Dictatorship of the invaded State. He has remained the President of Salvador ever since, and, after a short, desultory warfare, peace was restored throughout Central America. The absorbing individuality of General Barrios having disappeared, there seems to be no further obstacle.

The main staple produced in Central America is coffee, which since 1885 has risen so much in value that the planters

have grown rich, and prosperity has extended over the length and breadth of the land. The finances have vastly improved, indebtedness has either been reduced or consolidated at a lower interest, and railroad building resumed. In fact, the combined public debts of the five republics do not reach \$30,000,000 silver to-day, and with a joint population of 3,000,000 the new Union would owe less money relatively than any country south of us, while its credits abroad for the prosecution of public works would not fall much short of that of Chili. In other words, both American and European capitalists would undoubtedly be eager to complete the Central American railroad system if the new State were to allow some subsidies or merely guarantee the interest on railroad bonds issued by private companies. A prosperous, strongly constituted State, with the prospect of continued peace, would indeed have greater loaning power than the five comparatively poor republics as they stood in 1885.

The census of 1880 showed the population to be distributed as follows:

	Area. Kilometers.	Inhabit- ants.
Guatemala.....	121,140	1,357,900
Salvador.....	18,720	634,120
Nicaragua.....	133,800	259,794
Honduras.....	120,480	323,274
Costa Rica.....	51,760	213,785
Totals.....	445,900	2,788,873

Indians form a large portion of the population, but they are peaceful and industrious, and constitute a valuable help on the coffee estates. Although immigrants from Europe would be welcome, and find a healthy climate on the great plateau and mountain slopes, Central America can dispense with them. Even on the low lands the climate is so salubrious that the American surveying expedition in Nicaragua did not lose a single man; there was even a total absence of sickness, although they were often busy in the swamps. There is not a plant indigenous to tropical America which does not flourish in that part of our continent. At the same time, the mineral resources, of Honduras in particular, are magnificent. American capital is largely interested in mines, gold especially, and has been in railroads for 15 years past, in Costa Rica notably. Our trade has been as follows:

Import.	
1886.....	\$5,966,769
1887.....	8,420,491
Domestic Export.	
1886.....	\$2,467,632
1887.....	3,668,506
Totals.	
1886.....	\$8,434,401
1887.....	12,094,997
Increase.....	\$3,660,596

This increase is equal to 44 per cent. It is due, chiefly, to the rise in coffee and increased prosperity, calling for more American goods. San Francisco also does a large Central American trade, both import and export. There are few, if any, countries with which our trade increases as rapidly, especially now that the fruit business is being entirely transferred from sailing vessels to steamers.

Everybody, besides, wishes the Nicaragua Canal enterprise good success. This time it is systematically pursued; all the necessary preliminary steps have been taken, nor will there be a lack of capital. The canal will not be a work so expensive that there will be a necessity for appealing to

European capitalists; all the money that is wanted can be procured among us, and it will be an essentially American enterprise. It does not matter whether the Panama Canal be abandoned or not, for there will be traffic enough for both. At any rate, what we have shown will suffice to prove the growing importance to us of Central America, and the deep interest which the union movement has for us.

The Advance in Old Rails.

The rapid advance in the price of old iron rails in the West, which occurred in the third week in August, was one of those surprises in the iron trade which confuse the wisest. There had been some premonitory symptoms, it is true, but they were of a character to be accounted for in almost any condition of the market by a mere temporary increase in the demand. The price had fallen steadily from the beginning of the year, when they were sold at \$21 to \$22 at Chicago, until \$17.75 was touched in the middle of June, and \$18 to \$18.50 seemed like a very fair price to both buyer and seller. Up to that time old rails had been neither scarce nor yet over plentiful in the Western market. The supply was about equal to the demand, and prices simply moved in sympathy with the fluctuations in the value of other iron and steel. But when the lowest price named was realized there was a sudden revulsion as though bottom had been struck and a reaction was imminent. It is possible that if the Western rolling mills had not been just then on the eve of stopping to enter the fight for the wages scale for the coming year the rise in price would have taken place at that time.

This was an unfortunate suspension of animation in the old-rail trade for some of those interested in it. They misunderstood the exact situation of affairs, and presuming that another downward plunge would follow they either took contracts at ruling prices for future delivery or deferred purchases to fill old contracts until prices were lower. Herein they erred, but they were no more mistaken in their forecast of the market than their colleagues who refused to purchase at the prices offered and to take the chances of unloading at a higher or lower price in August or September.

Those who "went short," however, at \$18 to \$18.50 were unable to cover their contracts without loss in July, and when August came they found the Western rolling mills their active competitors in bidding for all available lots of old rails. The most active demand and the most decided upward movement in prices occurred in the third week of August, when a sudden jump was made from \$21 to about \$24 at Chicago. No warrant seemed to exist for such a sudden advance beyond the one very important fact that the supply of old rails was limited, but this was by no means a new discovery. It was known as well in June as in August. The rolling mills starting up needed a supply of material, it is true, but the condition of their business would hardly seem to justify the payment of 25 to 30 per cent. more for it than they were paying when they shut down. For a time rumors were current in the West of a combination of capitalists endeavoring to "corner" the old rail supply, but diligent

inquiry develops circumstances totally at variance with such a scheme. The "short" contracts taken when old rails were very cheap were hardly of sufficient importance to influence the market, although the efforts of the parties to cover became an interesting feature of the rapid advance. A speculative movement has developed, too, as the result of the existing condition of affairs, and some lots are being held in the West which the owners state that they do not propose to sell until the spring.

Other materials have begun to appreciate in value, either in sympathy with old rails or from the same cause which advanced their price, whatever that may be. The concurrent conditions of the general iron market may therefore favor the continuance of the higher rates for old rails which have been established, especially as the supply has apparently grown no more plentiful since the advance. As the price of new steel rails and old iron rails represents a difference of but \$6 to \$7 per ton, it would seem to be a very good time for railroad companies to make renewals, as a very small expenditure of cash would be required, unless they have now but a limited mileage of iron track in use. This is an important consideration in prognosticating the future course of old iron rail prices. The supply must, in the nature of things, get less and less every year with the exclusive use of steel rails for new tracks and renewals. Possibly this very year has been the first in which the long-expected curtailment of the supply of old iron rails has made itself manifest.

The English Naval Maneuvers.

The recent British naval maneuvers have shown England's naval forces in a pitiful light. So persistently have her war vessels been held up by every one as models of what modern fighting ships and cruisers should be, and so confident have always been the official statements of high speeds, that the accounts of the first completed performance will, no doubt, be surprising to the general reader. We have always held that the trial-trip speed schedules, according to which warships are customarily rated, are not only untrustworthy, but seriously misleading, and give no assurance whatever that a vessel listed as a 15-knot ship, for example, can ever attain this speed in regularly running. The trial trips, as conducted, last only from four to six hours; with this short time even the contract speeds can be maintained and the ships made to fill the stipulated requirements only with the greatest care, straining everything to the utmost. The most favorable conditions, moreover, are secured during these trials, conditions in part, which are rarely, if ever, realized in regular service, and the ships which go forth as 14, 16 and 18 knot vessels, as the case may be, are in truth anything but the promising specimens as which they are represented. It would perhaps be difficult to obtain a more striking demonstration of the truth of this than the maneuvers in question. The failures, as given in the available accounts, were of two kinds, all the ships, with one or two exceptions, having shown themselves to be much slower than claimed, and the machinery having in many cases broken down or got out of order. The slowness of the ships

was indeed something surprising, though the general state of inefficiency was none the less marked, and is graphically portrayed as follows, by the London *Engineer*.

We have no very definite information on the matter as yet, but enough is known to prove that little dependence can be placed on the marine engine in the navy. We do not speak now of torpedo-boats, but of large ships. Admiral Baird doing his best to get to Dover was severely hampered on the way. On Saturday Admiral Baird took his six fastest ships, leaving behind him what ought to be a powerful force to join him as soon as possible. The utmost that could be got was a pitiful 9 knots. The old Northumberland did this with two boilers to spare. The boilers of the Shannon were in trouble, and the Northampton could not keep up; when asked to get on a little quicker she telegraphed that she was doing her best. The Inflexible broke down with her starboard engine and dropped astern, still keeping her port screw going. On the preceding Wednesday the big ends of the Neptune's connecting-rods began to knock so hard that, although the enemy was believed to be in sight, she had to go into Holyhead for four hours to take up the slack. Seeing that the ship has not steamed 500 miles continuously, this seems a strange state of affairs. Next the Shannon blew the packing out of her high-pressure piston-rod gland, and she had to stop for half an hour.

Truly a remarkable condition of things. Had all these mishaps occurred in actual warfare our English cousins would have been badly handled. But comment is scarcely necessary. The facts, as presented, speak for themselves and certainly do not add to the glory of the British navy.

Waterways and Railways.

The new Railway Regulation act passed by the English House of Commons makes some decided changes in dealing with the difficult subject of transportation regulation. It provides that freight rates on the canals shall be reduced by the commissioners whenever it shall appear that they are made unjustly high by the railways. This is so worded because the railways in England have acquired ownership of many of the most important canals, and have so arranged the water tariffs as practically to divert traffic to their own rail lines. It was the opinion of the House of Commons that the merchants should have the benefit of water competition, if necessary, under compulsion of law.

The question of water and rail competition is an old one, but has lately called out more discussion. Waterways are to-day receiving great attention from the governments of Continental Europe. It is proposed to make the already fine rivers of Russia, Austria and Germany more capable of carrying a large freight traffic, while there are many proposals for artificial canals—such as the one to connect the Baltic with the North Sea. In the United States we have already had deep sea conventions to urge the necessity of a suitable port upon the Gulf of Mexico and the importance of the matter to the citizens of Colorado and other Western States, as well as the one more immediately interested—Texas. It is undoubtedly true that the days of usefulness for short and disconnected canals have passed away. Such waterways not forming parts in through routes cannot compete with the railroads, but the case is otherwise where such great through lines by water can be established. There is no danger of the commerce of our

lakes falling into permanent decay, nor, indeed, upon any canal or river connecting with them, except from neglect on the part of the Government and the people directly concerned.

Are such rivers and canals, supported at public expense, unnatural and unjust competitors with railroads? Facts do not show any real ground for this assumption. At first, indeed, we see the waterways taking from the railroads, by reason of lower prices, a certain amount of business which, were it not for the waterway, would go by rail; but the loss is not a real one. There are certain articles which for successful manufacturing demand the lowest possible rate per ton, a rate which for any distance the railroads, under our present circumstances, can scarcely be expected to quote, or if they do, it is under compulsion. But these raw materials once moved at the cheap water rate, there arise large manufactories which give to the railroads carloads of finished product, tons of freight to and fro at comparatively high figures, breadstuffs and supplies to the tradesmen and finally a large passenger travel. All these advantages to the railroad arise from the establishment of a manufacturing center, whose profits in turn may depend upon the cheap water carriage of its raw material. Under such conditions it is an economic error to give undue prominence to the cheap traffic lost to the rail carrier without regarding the far more valuable tonnage at higher rates which these conditions secure to it. It is in the long run no disadvantage to a railroad to have even severe water competition; the situation of many of our most thriving railroads confirms this view. If this be the true view to take of the establishment or maintenance of connecting waterways, it follows that the opposition to them on the part of our transportation men is not dictated by a far-sighted policy, and their evident distrust of the first effects of water competition should be allowed only its due weight in considering the enlarging of our water system. What will benefit the manufacturer and dealer will in the end benefit the carrier also. Here, too, appears the error in allowing the railroads to buy up and abandon or but partly use their competing canals. The Pennsylvania Railroad has followed English precedent in this respect, as we think to its own detriment as well as to that of towns and cities interested. At least no more of our waterways should pass into railroad control without carefully guarded provisions as to operation. This, then, is the justification for the spending of money by the Government, either State or national, upon improved and cheaper means of transportation. It is a public work which, if done in reason and with a wise policy, must inure to the benefit of all our interests, our railways being included.

The law of compulsory insurance of workmen against injuries in Germany has now been in force for over two years, and ironmasters in that country are getting into a position of being able better to count the cost. The results of such an investigation are not calculated to make them very contented with the law or to lead them to look with equanimity at the efforts to force them to acquiesce in the proposed act providing pensions for work-

men. A recent issue of *Stahl und Eisen* contains some very instructive figures. When the insurance act was passed the Government presented estimates to show how the payments for compensation to men injured at work might be expected to grow, taking the sums paid in the first year as the unit. Tabulated, the progressive increase is as follows:

1st year	1.00	17th year.....	19.67
2d "	2.48	20th "	21.88
3d "	4.00	45th "	32.07
10th "	13.10	70th "	33.23

The increase from year to year is, of course, due to the growing number of men receiving compensation for injuries rendering them invalids. Now, for the first 15 months, from October 1, 1885, to December 31, 1886, the money paid to injured workmen was 67,118.98 marks in the association of iron and steel works of Rhenish Prussia and Westphalia, the largest branch in the country. The number of men insured was 70,313, on an average their total wages for the 15 months being 83,841,224.71 marks. In 1887 the sum paid was 226,347.09 marks on 72,101,410.79 marks wages paid to 74,179 men. These figures are exclusive of the cost of administration, 43,753.20 and 35,014.65 marks respectively, and exclusive of payments to reserve fund, which was 201,356.94 marks for 1885-86 and 452,694.18 marks for 1887. Per capita the damages, exclusive of cost of administration and reserve fund payments, were 0.95 marks in 1885-86 and 3.05 marks in 1887, while per 1000 marks of wages the payments for compensation to workmen injured footed up to 0.80 marks in 1885-86, rising to 3.14 marks in 1887. It is this rate of increase which is staggering to German ironmasters contrasted with the official estimates. The sum is nearly four times greater during 1887 than during 1886, instead of being less than two and a half times greater. If the present rate goes on German ironmasters will soon have to pay 2 per cent. of the wages earned for damages for injury sustained, exclusive of the cost of administration.

According to reports on the industrial situation in England, made to the London Board of Trade, there is every indication of a moderately prosperous autumn and winter, in pleasing contrast to those of the last three years. Seventeen trade societies have reported that of their membership of 186,120 persons 7000 are unemployed. During the past month the proportion of unemployed workmen reported has fallen from 5 to 4 per cent., in comparison to 9 per cent. unemployed at this time last year. The industrial situation is not up to that of seasons of really good trade, but is steadily improving.

M. Nathan, of the firm of Swarts & Nathan, among the most prominent Chicago wholesale dealers in old iron, returned on August 29 from a four months' trip through France, Germany, Austria and Russia. He received a most flattering ovation from his friends and business acquaintances on his arrival home.

Contracts for materials for the armored steel cruiser Maine were awarded as follows: Calvin A. Baynon, New York, screws, \$396; Rowland A. Robbins, New York, wrought iron, lead, zinc, tin, hardware, varnish, ship chandlery and leather, \$14,475; J. J. Donovan, New York, nails, locks, hinges, linseed, sperm and lard oils and alcohol, \$1834.

CORRESPONDENCE.

The Influence Of Aluminium Upon Cast Iron.

DETROIT, September 1, 1888.

To the Editor: My attention has been called to a criticism of my tests, by Mr. A. E. Hammer, on page 318 of *The Iron Age* of August 30.

The question as to the influence of the contained silicon is a fair one, but, as against my published results, he makes positive statements regarding the effect of very small percentages of silicon upon my white cast iron, is it not fair for me to demand of him experimental proof of his statements?

He evidently is not familiar with the characteristics of this white iron, containing only 0.03 sulphur and 0.186 silicon, when he says that "the carbon is near the balance—that is, near the point where it will readily assume either the combined or the graphitic form," and his erroneous statement that my iron contains 0.3 sulphur makes his assumption vastly more wide of the mark. Until he produces experimental proof to support his statements, the only way for me to disprove them is to give results from my own experiments.

He states that 0.02 per cent. of silicon would produce a perceptible change, and that 0.44 per cent. would be sufficient to account for the gray grain and the taking out of chill that I ascribe to aluminium. The facts are that this white iron is most persistently white, and the result of a large number of experiments with this iron shows that such balance as he speaks of is not reached until 2 per cent. of silicon is added, and it took 3 per cent. to produce the effect upon the carbon as to color of the casting which was produced by the 1 per cent. of aluminium. In taking away the tendency to chill, 1 per cent. of aluminium left $\frac{1}{4}$ inch chill, while 2 per cent. and even 3 per cent. of silicon was required to bring it down to $\frac{1}{8}$ inch.

I stated in my paper that "silicon and aluminium work together in the same direction," but all of my experiments prove that with this white iron such small percentages of silicon as he mentions produce no appreciable effect upon grain, chill, shrinkage or fluidity, and that until about 1 per cent. of silicon is added the result is not sufficient to be seen, and then not enough to be measured. Understanding perfectly the effect of silicon on this white iron, I knew that even 0.44 per cent. would not influence the metal enough to affect the measured results of the influence of aluminium.

I do not think it can be proved by experiment that this small percentage of silicon which he names would produce the effect that he claims—or, in fact, any effect whatever—although by inference we have a right to assume that any amount of silicon does produce a corresponding effect. I endeavored in my paper to state plainly that the crucible might give up or the metal be deprived of much larger percentages of silicon than he mentions, and that, therefore, on account of these errors in the most carefully conducted experiments, none but general conclusions can be drawn. The error due to these small percentages of silicon, added with the aluminium, is less than the error I have spoken of, and neither of them alone, or added together, is sufficient to materially affect general results.

The gray iron that I use for tests has its carbon on the balance that he speaks of, and for delicate tests I use this iron. It was to this and not to the white iron that I added the 4 per cent. of aluminium. It gives $\frac{1}{4}$ inch chill; 3 per cent. of aluminium took out all chill, but with twice that amount of silicon there still remains a chill. So far as blowholes are concerned,

some of the effects of small percentages of silicon may be measured by the increase in strength to resist weight and impact. What my experiments prove, is that aluminium acts in this manner.

In the short time that I had at my disposal I treated only of the influence of aluminium. When Mr. Hammer calls for a publication of more facts, does he not forget that he has met the facts that I have already published by mere suppositions? I shall soon be ready to publish the results of a very large number of carefully made tests, to show the influence of silicon upon cast iron. And, in the meantime, if I have not given a complete answer to the objections raised, I shall endeavor to give further information.

W. J. KEEP.

OBITUARY.

C. P. BUCKINGHAM.

Gen. Cartherinus P. Buckingham, president of the Chicago Steel Works, of Chicago, died at his residence in that city on the 30th ult., after a brief illness. He was born in 1808 at a small village called Springfield, near Zanesville, in Muskingum County, Ohio. His father was a merchant, and his mother was Catharine Putnam, daughter of Gen. Rufus Putnam. He graduated from the United States Military Academy at West Point in 1829, standing third in a class of exceptionally bright students. Entering the Topographical Corps of the Army, he was detailed after a year's service to West Point as Assistant Professor of Natural Philosophy, which position he resigned a year later to fill the chair of natural philosophy in Kenyon College, at Gambier, Ohio. He removed to Chicago in 1856, and in connection with Solomon Sturges built the Illinois Central grain elevators. In 1861 he re-entered the United States Army, was made Brigadier-General, and was selected to perform delicate and important functions in connection with raising troops, locating arsenals, &c. He resigned shortly before the close of the war and for several years was engaged in the elevator business in Brooklyn, N. Y., removing to Chicago in 1868 to assist his brothers John and Ebenezer in managing the elevators he had himself built. In 1873 he and his brothers established the Chicago Steel Works, which have been successfully operated by them from that time until the present. These works are among the few mills in the country making a specialty of manipulating old steel rails and putting them into merchantable shapes, for which they use machinery of original and very ingenious design. Under General Buckingham's active supervision, with the cordial co-operation of his brothers, this machinery was perfected and the works have steadily grown in importance, their products being used in the leading plow and other agricultural manufactories throughout the West.

Reports of the Edinburgh meeting of the Iron and Steel Institute, just at hand, show that, as expected, no matters of startling interest came up. The most valuable paper presented was that of R. A. Hadfield, of Sheffield, on the manganese steel with which his name is coupled, and a description by Daniel Adamson of a testing machine. A number of Americans took part in the discussions, among them T. C. Clark, of the Union Bridge Company; Capt W. R. Jones, of the Edgar Thomson and Homestead Steel Works, and Dr. T. Sterry Hunt. The latter spoke, too, in reference to the proposed meeting in this country, but as the institute is to go to Paris next year, the visit has been further postponed.

Washington News.

(From Our Regular Correspondent.)

WASHINGTON, D. C., September 4, 1888.

The caucus of the Republican Senators has materially changed the programme of that wing of the higher branch of Congress. At the gathering at Senator Edmunds's residence last Wednesday night, it was determined to shorten the time for hearing of representatives of the industrial interests to ten days, and the Subcommittee on Finance have since been faithfully working up to that point. It is now confidently expected that the whole bill will be reported to the full committee by next Tuesday. Senator Beck, though next to Senator Voorhes on the Democratic side of the committee, is really the active leader on the tariff. He said to-day that he could not say what the policy of his side of the committee would be on the bill when reported there, for the reason that the Republicans had not yet permitted them to see it, nor had they said anything to them as regards even an outline of the measure. He said it might only receive a *pro forma* opposition in committee, reserving the main contest for the floor of the Senate. He said he would know more about that after he examined the bill. He admits that there will be a lengthy discussion in the Senate. The Democrats there will stand upon the platform of the Mills bill and will attempt to show that it is not a free trade measure, nor a stride in that direction, but purely a movement to reduce the revenue.

The bill as it stands makes no material changes in the metal schedule neither in raising duties where they should be nor lowering them where it can be done. Steel rails are scheduled down to \$15, but even this may be changed. The chief grounds of difference have been on the lumber, wool and sugar schedules. An increase of duty of one cent on the finer grades of wool has been assented to in the subcommittee, and lumber has been allowed to remain unchanged, but sugar comes in for a 50 per cent. cut, which is objected to by the Kansas Senators on account of the sorghum interests of their State. The sugar reduction would foot up but \$30,000,000, and the balance of the reductions proposed would be more likely to increase than decrease the revenues, so that the rest must come from internal revenue. Senator Allison says that the bill which will be reported will receive the united support of the Republicans, but the length of the debate and the time of its passage will depend largely upon the course of the Democrats. They will be accorded full swing in discussion, and when they get through a vote will be taken.

The passage of the bill in the Senate will be followed by conferences and non-concurrences, which will depend entirely on the amount of time consumed upon the obstinacy of the conferees and the disposition of the two Houses to enter into much of a debate on the conference reports. After one or two disagreements the House may refuse to appoint conferees, which will bring matters to a standstill. This may lead to a recess or an adjournment some time in October. The tariff question is remote from being settled as far as legislation in this Congress is concerned. It is more likely that the representatives now in nomination for election to the Fiftieth Congress will have that knotty question to deal with. The 6th of November will determine whether Mr. Mills or a Republican committee will prepare the bill for that Congress to dispose of, and whether Grover Cleveland or Benjamin Harrison will exercise the Presidential power of approval or veto.

Recent Legal Decisions.

PROMISSORY NOTE—PAYMENTS MADE TO AGENTS.

Q. gave his note for \$800 to H., but did not pay it, and H. placed it in T.'s hands for collection. T. was a lawyer, and in the course of the month H. advanced more money to Q., and took a note for the whole sum due. Q. fell into the habit of paying the interest on the note to T., though the note was made payable at the Bank of California, and he, also, made a payment on account of the principal to him, all of which payments were sent to the Bank of California. The payment on the principal was credited on the note but the interest was not indorsed. T. did not have the note in his possession when the payments were made, but H. knew that Q. was making the payments under the impression that T. was still his agent. H. transferred the note to his daughter, after its maturity, but did not give Q. any notice that he had done so. Suit was brought to enforce the payment of the note, and Q. sued to restrain its collection, he having paid in full to T., but he was defeated. H. carried the case—*Quinn vs. Dresbach*,—to the Supreme Court of California, where the judgment was reversed. Judge Hayn (of the Commission of Appeals), in the opinion, said: "It was negligence in H. to allow Q. to act in the belief that T. was authorized to receive payments on the note. He, H., knew that T. was acting in some way as his agent in making these collections, for the bank knew this, and the knowledge of the bank, which was H.'s agent, must be imputed to him. Here T. had ostensible authority to act for H.; it would not be supposed by H. that he was acting for Q. Ostensible authority is defined to be 'such authority as a principal, intentionally, or by want of ordinary care, causes or allows a third person to believe his agent to possess.' The fact that the note was not in the possession of T. does not change the result. The want of this possession is a circumstance to be considered in determining the question of authority, but is not conclusive. The fact that the bank held the note for collection would not prevent the owner from collecting it himself. And the transfer to H.'s daughter gave her no right, the note having matured, her father did not have, as no notice thereof was given to Q. The judgment must be reversed."

PROTEST—PRESENTMENT.

M. H. and T. H. made their note March 11, 1884, payable in 10 months, with F. as nominal payee, E. being the actual payee. E. indorsed the note, and both he and F. put over their names "waive notice and protest." The note was dated at Belleville, Kan., but the H.'s did not live at Belleville, nor did they receive their mail there. The note was not paid, and in the certificate of protest it was stated that the note was presented to the H.'s at Belleville for payment, and that it had been refused; that notice of dishonor had been sent to the H.'s in an envelope, postpaid, directed to Seape and Concordia, Kansas, respectively, and that at the same time the same notice was sent to E., directed to Belleville. E.'s post office address was not known, and, in fact, neither he nor the H.'s got the notices sent. An action was brought on the note against E. and the H.'s, and E. depended on the ground that there had been no demand made on the H.'s and that he had had no notice of dishonor. Plaintiff had judgment, and E. carried the case—*Davis vs. Eppher*—to the Supreme Court of Kansas, where there was an affirmation. Judge Holt (of the Commission of Appeals), in the opinion, said: "1. The residence of the maker

being unknown, it was sufficient that the note was ready for presentment at the place where it was made. 2. Notice was properly sent to E., at Belleville, his residence not being known. 3. The waiving of notice and protest made the indorsers absolutely liable without protest or notice."

INNKEEPER—LIEN ON GOODS OF DRUMMER.

D. was the traveling salesman or "drummer" of N., and he carried with him trunks and packages of samples of the goods he was selling. He stopped at the hotel of C. and there ran up a bill of board, on which, from time to time, he made payments. The account was extended over the greater part of the year. No information reached N. of D.'s default in payment until after the debt was incurred, when he found that the innkeeper held the samples under claim of a lien thereon, on the ground that N. was liable for the bill, as it was made by D. in the course of the work done for N., as his agent. N. had recovered the sample goods in an action therefor. N. refused to pay the balance of D.'s bill when C. demanded payment, and an action was brought therefor—*Covington vs. Newberger*—and the plaintiff recovered. N. carried the case to the Supreme Court of North Carolina, where the judgment was reversed. Judge Davis, in the opinion, said: "The plaintiff relies upon the implied promise of the defendant to pay this debt. He seeks to establish his liability by the rule that where a principal sends his agent through the country to sell goods for him the principal gives the agent, by implication, authority to bind him for all charges incurred in the performance of his duties. Conceding this rule to be well settled, can it be easily assumed that it is within the scope of the agent's authority to make debts and charge his principal therewith? He was employed to sell goods, and it may be that all reasonable and necessary expenses (whether he be furnished with the money by his principal to pay or not) as he travels through the country may be an implied charge against his principal as a necessary incident to the business of the agency; but this must be within the limits and subordinate to a well-known custom. But the plaintiff has testified that it was the general custom of transient patrons, as D. was, to pay cash for their bills. There were exceptions, he said, but he did not show that this case was an exception. The long and continued failure of D. to pay his bills for board in full, according to the general custom, ought to have put plaintiff on inquiry; and he should have gone to his principal with notice, else he put himself open to the charge of collusion with the agent against the principal. It is insisted by plaintiff's counsel that if he cannot hold N. for the debt, still plaintiff had a lien on the goods in possession of D. for the hotel charges, he being a guest, unless he knew the goods to be the property of another. But assuming that plaintiff had notified the defendant that his agent had failed to pay for his bill, and assuming that a lien would then arise to bind the goods for the bill, still, if the innkeeper allowed the agent to take the goods away, though he brought them back again, and extended the credit given for board from time to time to the agent, as the amount here indicates, he would have no lien for the amount of the unauthorized credit on the goods of the principal. The judgment was reversed."

ACCOUNT STATED—MISTAKES—DELAY IN OBJECTING.

H. rendered to M. his account against him, and the latter held the account without objection for three months. An action was brought to recover the balance stated to be due, and M., in his defense, attempted to show that mistakes had been made in stating the account; but the Court ruled against this evidence, and H.

recovered a judgment. The case—*Hendy vs. March*—was carried to the Supreme Court of California, where the judgment was affirmed. The case was decided by the Commission of Appeals, the judgment of which was approved by the Supreme Court. Commissioner Hayne, in the opinion, said: "The delay of three months to object to the account is a sufficient acquiescence in its correctness, and such acquiescence is an admission that the account is correct. Between merchants at home an account which has been presented, and no objection made thereto, after the lapse of several posts, is treated, under ordinary circumstances, as being by acquiescence, stated account, and between merchants in different countries a rule founded on similar considerations prevails. But the defendant contends that even if this is the case, he is entitled to show mistakes made in stating the account. The answer to this is this: An account stated becomes a contract, for an account stated alters the nature of the original indebtedness, and is itself in the nature of a new promise or undertaking. Therefore, an account stated with a new firm may include debts due to a former firm, or to one of the partners. An action upon an account stated is not founded upon the original items, but upon the balance ascertained by the mutual consent of the debtors and creditors. If there is any mistake in the contract thus created it must be made, as in any other case, an issue in the pleadings, and tried upon that issue; it cannot be shown as a defense to the original indebtedness."

PARTNERSHIP—FRAUDULENT CONVEYANCE BY PARTNER OF HIS OWN PROPERTY.

S. & R., merchants, were indebted to S., S. & Co. for goods sold and delivered to them, and they became insolvent. S., one of the debtor firm, conveyed to J. J. S., who acted in good faith, certain land, in consideration that he would pay his individual creditors \$3500, the amount of their claims, they accepting J. J. S. as their debtor for S.'s debts. The property had a possible value of \$4600, or \$1000 in excess of the consideration got. S., S. & Co. brought suit to set aside this conveyance as fraudulent as to them as creditors, and they had judgment. The defendants made a case on appeal, *Smith vs. Sely*, to the Supreme Court of Indiana, where the judgment was reversed. The chief justice (Mitchell), in the opinion, said: "When it is established that a grantee has taken a conveyance of a debtor's property under circumstances which make him guilty of positive fraud, and the transaction is fraudulent in fact, the conveyance will be deemed absolutely void as to the grantor's creditors, and will not be permitted to stand even as an indemnity for any payment the grantee may have made. If, however, a court of equity finds that property has been purchased from a failing debtor without any positive fraud upon the part of the purchaser, and yet under such circumstances as make it a highly injurious act and inequitable as to creditors that the conveyance should stand as a conveyance, it may be set aside on such terms as will protect a purchaser whose purchase is only constructively fraudulent. In the one case the transaction is fraudulent in fact, and the conveyance is utterly void as to creditors, and cannot be permitted to stand for any purpose; in the other the conveyance is fraudulent by construction of law, and is set aside upon consideration of public policy only, and then upon the condition that the equities of the purchaser, who was guilty of no actual fraud, be protected. The conveyance in this case, if fraudulent at all, is constructively fraudulent only; and equity must be done to the grantee. It is our opinion that the conveyance should not be disturbed. There was but a barely possible margin of \$1100 on the property, taking the highest esti-

mated value, and when we consider that an honest debtor in embarrassed circumstances is sometimes compelled to sell real estate under its value, and that honest purchasers are not compelled to pay the highest value possible, we are unwilling to concur in the conclusion arrived at by the court below, that the conveyance ought to be set aside as constructively fraudulent.

Mill Roofs.

Although the constructive features of mill roofs are well defined there is a wide diversity of experience and opinion with regard to roof covering. The extract which we give below, from a lecture on "The Evolution of the Modern Mill," delivered a short time ago by C. J. H. Woodbury at Sibley College, will therefore prove specially interesting.

The present form of factory roofing, says Mr. Woodbury, resembles a floor in its construction, being made in a similar manner of plank laid upon beams which project through the walls, where they act as a bracket to the cornice, the ends being sawed after any suitable ornamentation. The inclination for such roofs is about $\frac{1}{4}$ inch to the foot. Where a mill is narrow enough for a single beam to reach from the wall to the ridge they form cantilevers, the second point of support from the wall being by the columns one-third of the distance across the mill, and the ends of the beams are further secured together by means of iron dogs. For mills of greater width the beam would reach only to the row of columns, and over the middle of the mill a beam is placed, usually horizontal on the under side, and hewn down from the middle to each end, so as to preserve the same slope on the upper side of the beam as for the roof. In many instances mills are built with brick cornices, without any of the wood projection from the side, and in other buildings the walls are carried above the roof, which slopes toward the center, and all water falling on it or melted from the snow is conducted from it by pipes leading down through the middle of the mill. It is not desirable to place gutters around the edge of the mill as they serve no useful purpose and are in continual need of repairs. By leaving the edge of the mill plank square and protecting it by sheet metal flashing the rain falling from the roof can be received by a concave walk of coal tar concrete placed on the ground around the building. Suitable porches over doors, or some guard on the roof at these points, will prevent people who may be passing in at doors from being unduly wet by water from the roof.

There are numerous forms of roof coverings, the use of the different varieties being to a great extent local—that is, the sheet-iron coverings used in the Middle States are almost unknown in New England, and in the latter place the ordinary tinned iron roofing is universally painted, while in the Dominion of Canada it is laid obliquely and never painted. It is conceded by all that the sheet copper forms the most desirable method of covering a roof, and if one could be assured of the permanence of the structure, irrespective of the necessity for making changes every half year in order to keep pace with the march of invention, it would doubtless be shown that under such conditions of permanency copper would form the cheapest roof. The most widely used roofing materials for this class of buildings are the asphalt and the coal-tar roof, the latter being the most widely used in New England. There are numerous varieties of these composition coverings, which are applied by various methods. Some of these are of the most satisfactory character, while others are poorly designed and unskillfully

applied, and are a constant source of trouble and expense to the occupant of the building.

One of the leading manufacturers, the efficiency of whose work for many years over a large amount of mill property I can vouch for by personal knowledge, uses the following method of applying the roofing: Three layers of roofing felt are placed on the plank parallel to the eaves, and continued by lapping each additional layer two-thirds of its width upon the preceding one, and in this manner covering the roof with three thicknesses of the felt, breaking joints. This is secured to the roof by nails through tin washers and coated with a melted composition, and then two additional layers of felt are placed over the whole. Another coat of composition is then applied and gravel is placed over the whole while soft. This maker does not approve of the practice of cementing each sheet of felt when it is laid, because it does not allow the felt freedom to yield from the expansion and contraction of the roof. When tin is applied to roofs, rosin-sized building paper should first be laid on the roof plank, and the sheets of tin should be painted on the lower side before being laid.

Of late years cotton duck has been applied as a roof covering, and has been watched with a great deal of anticipation, although it has been used for similar purposes in covering ships' decks for many years. But the two uses are not strictly comparable, because the ship's deck is calked tight, and therefore the covering is free from the application of moisture underneath, while the roof is never tight, and the warm air underneath, heavily charged with moisture, which permeates the cracks between the planks, becomes chilled and condenses as it nears the top, carrying on a process of distillation. As an example of the extent to which this can be carried on, I have known of instances where people presumed they were making a good roof by leaving slight air spaces by means of the furring laid between the roof plank and the top boarding. The circulation of air in these spaces deposited sufficient moisture to rot the boards. A mill manager, wishing to have a roof over a very warm room, which should be both tight and a very perfect non-conductor, made a roof containing a space of about 16 inches, which was filled with sawdust, and the roof boarding on top of this was covered with tar and gravel in the usual manner. In a few weeks the water began to drip through the ceiling as if the roof was leaking, although there was no snow on the top of the roof. Investigation showed that within that short time a sufficient amount of water had condensed with the sawdust to saturate the whole. I would say in this connection that 3 inches of plank afford an ample protection against condensation over any ordinary processes of manufacture, although 4 inches of plank have been used as a roof over paper machines in order to be safe beyond peradventure; but it is necessary that nails should not be driven into the bottom of this roof plank, because the point of a nail will reach to a lower temperature near the outside of the roof in the winter, and being a better conductor, it will cause moisture to condense upon the head of the nail.

Tin roofing is so general in use as not to require any allusion to methods of application, but the only course to reach economical and satisfactory results for a term of years, especially for locations near to the seashore, is to use the best quality of dipped roofing plates of some brand which can be relied on as conforming to the standard and free from "wasters" or imperfect plates. Duck roofing has been successfully applied by first laying and tacking down a covering of two-ply asphalt paper, and upon this was spread a

covering of rosin-sized sheathing paper, tacked in the usual manner. Upon this was laid a covering consisting of cotton duck, 44 inches wide and weighing 28 ounces to the yard. Several methods of joining the edges of the duck together have been tried, resulting in the abandonment of the method of sewing used, for the preferable method of nailing the duck down, laying one strip over the other, and then opening the duck, a lock joint is formed without any jointure between the two sheets exposed to the weather. After the duck is stretched on the roof, it is securely fastened by means of round-headed woodscrews, $1\frac{1}{4}$ inches long, through a concave tin washer $\frac{1}{2}$ -inch in diameter, resting upon a $\frac{1}{4}$ -inch washer made of roofing felt. A coat of hot pine tar with a small quantity of linseed oil is laid upon the whole of the duck roofing, after being laid, for the purpose of filling the fiber and preserving the cotton fabric by means of the antiseptic principles of the pine tar. The surface is then covered with two coats of mineral paint.

Within a year paper has been very successfully used as a roof covering. Sheets of wood pulp board about $\frac{1}{4}$ inch in thickness are treated by a process which renders them hard and elastic, and secured upon the roof by means of tacks through concave tin washers. The edge of each sheet is grooved, in order to allow for the expansion and contraction of the roof. The whole roof is then covered with a heavy mineral paint. Experience with this during the past severe winter in Maine has been of the most satisfactory nature. Shingles furnish a much better roof covering than slate, both in the matter of conduction of heat or cold in the extremes of summer and winter and also in resistance to fire. The heat of a slight fire underneath the roof will cause slates to crumble, and the same result will be obtained by heavy sparks falling and burning upon the roof. Some people treat shingles by boiling them under pressure in a solution of salt and chloride of lime for the purpose of antiseptic treatment and also to render them fireproof.

A better class of sugar machinery is much needed in some parts of Brazil, where, as a rule, the machinery employed for extracting the sugar is of a very primitive description, and although the sugar-cane contains 14 to 16 per cent. of saccharine, the manufacturers often obtain no more than 6 per cent. Lately, however, owing to the competition of beet-root sugar, the want of improved machinery has been very keenly felt, and here and there large establishments are springing up furnished with modern machinery, which has been mostly imported from France. These companies are generally formed with a capital of 1,000,000 francs to 1,500,000 francs, and, notwithstanding the low prices of sugar, are able to pay a dividend of about 10 per cent.

Minneapolis claims to be the champion wheat depository of the Northwest. The receipts at that point for the crop year ending August 31 were 47,109,490 bushels. This is said to be the largest quantity of wheat ever received in any primary market in the world. When it was announced last year that 39,278,380 bushels had been received in Minneapolis it was said the record would never be equaled. This year the increase is 7,831,110 bushels.

Three important industrial exhibitions open in the West this week. Columbus, Ohio, led off with its Centennial on Tuesday, followed the next day by the opening of the annual exhibitions at Chicago and Milwaukee. Exceptionally attractive features are announced at all of them.

TRADE REPORT.

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St.,
PHILADELPHIA, Pa., September 4, 1888.

Pig Iron.—The market has shown a considerable amount of firmness during the past week, and, while prices show no quotable change, the tendency is gradually in the direction of higher figures. Scarcity is perhaps the most prominent feature of the market. There is a disposition to sell within moderate limits and not much of a desire to force a higher range of prices. The conditions are such that any slight falling off in other markets would immediately influence us, hence Philadelphia is inclined to follow an advance rather than to lead one. In the meantime prices are relatively as low, if not lower, than in almost any other market, so that holders, as may be expected, are very firm. There is no urgent demand; consumers are taking 30 or 60 days' supplies at current rates, which is about as much as sellers are willing to enter for the present. Bids at current rates have been made in some cases for lots deliverable during the next six months, but they have not been taken into serious consideration. There is evidently more interest manifested in the market than for a long time past, and while most people expect an improving condition of affairs, there is not much chance of any material advance in prices. It is thought that 50¢ to \$1 per ton would bring in a good many furnaces, and those who are now in blast are not disposed to make a market, which would, perhaps, only lead to a higher cost and increasing competition, without any corresponding increase in consumption. Of course, if the position really calls for a larger production it will be impossible to prevent an advance in prices, but the trade are not inclined to make advances until it is seen that they are fully warranted. Meanwhile sales are being made at about last week's prices, say \$16 @ \$16.50 for Gray Forge, \$17 @ \$17.50 for No. 2 Foundry and \$18 @ \$19 for No. 1, tidewater delivery, or its equivalent. Nothing doing in Southern Irons; the much-talked-of cargo of 2000 tons, recently delivered at this point, was chiefly to close an old contract made by Justice Cox, Jr., & Co. for one of the large Pipe concerns in New Jersey.

Foreign Iron.—Nothing doing in this department, although consumers are manifesting some interest in the matter. Asking prices remain as follows: \$19.50 @ \$20 for Bessemer, c.i.f. duty paid.

Blooms.—A fair average business is doing, but without change in prices, which are about as follows: Nail Slabs, \$28.50 @ \$29.50; Billets from \$30 to \$35, f.o.b. cars at mill, according to analysis; Charcoal Blooms, \$52 @ \$54; Run-out Anthracite \$42 @ \$44; Scrap Blooms, \$33 @ \$35 per "bloom" ton of 2464 lb. Foreign at tide, c.i.f., duty paid, \$29 @ \$30 for Nail Slabs; \$31.50 @ \$32.50 for 4 x 4 Billets, and \$35 @ \$39 for Siemens-Martin, price according to analysis, &c.

Muck Bars.—The market has been very active, with sales at prices ranging all the way from \$27.50 to \$28, delivered. Mills are now nearly all sold close up, and quotations are said to be from \$28.50 to \$29, delivered, although it remains to be seen what buyers will do in the matter. Bids of \$28 have been declined, however, and the position seems to be very strong.

Bar Iron.—The demand has been increasing for some time, until at last prices are beginning to respond to the improved condition of affairs. There is still a great

lack of uniformity in quotations, but they average an advance of pretty nearly a tenth, compared with those made two or three weeks ago, and from present appearances the improvement is likely to be maintained. There is nothing spasmodic in the demand, nothing specially large in any particular line, but from all sources orders come in a steady flow, indicating a generally satisfactory consumption in all departments. It is not unlikely, however, that the demand for Skelp Iron has been of considerable advantage to some of the local mills, most of which are now pretty well filled up for several weeks to come. A very similar condition of affairs is also said to prevail in the interior, so that new business is not run after as it was some time ago. For the same reason buyers find that prices are higher, and, while no large orders have been taken at any material advance, sellers are not disposed to accept business without securing some concessions in their favor. On the whole, the impression is that prices have touched bottom, and with favorable developments during the next two weeks it is not improbable that still further advances may be demanded. As already stated, quotations are very irregular, but most of the leading mills quote 1.85¢ @ 1.9¢ for Best Refined Bars, and are said to be very firm. Others however, whose make of Iron is not as well known, might perhaps shade a fraction, but the general tone is one of strength and firmness. Large sales of Skelp Iron have been made at 1.8¢ @ 1.82½¢ for grooved, and 1.9 @ 2¢ for sheared, but higher figures are asked on new business.

Plate and Tank Iron.—The demand is improving and sellers are showing more firmness than they have for several weeks past. No specially large orders are on the market, but there is a good general demand and the outlook is said to indicate a still larger business as the season advances. Mills are not heavily loaded with work, but they seem to have all they can handle from week to week, and with still better prospects ahead there is a disposition to ask a little more money, or on specially desirable orders to hold firm at last week's prices, which are about as follow: Ordinary Plate and Tank Iron, 2¢ @ 2.10¢; Shell, 2.4¢ @ 2.5¢; Flange, 3.5¢; Fire-Box, 4¢; Steel Plates, Tank and Ship Plate, 2.3¢ @ 2.4¢; Shell, 2.7¢; Flange, 3¢ @ 3½¢; Fire-Box, 3½¢ @ 4½¢.

Structural Iron.—A somewhat better demand is reported for small lots, but there is nothing of importance on the market. Mills are moderately busy on specifications to complete old contracts, and it is said that prospects for new work are fairly encouraging, but there is nothing very definite at present. Prices firm as last quoted, viz.: 2.10¢ @ 2.15¢ for Bridge Plate; 2¢ @ 2.10¢ for Angles; 2.6¢ @ 2.7¢ for Tees, and 3.8¢ for Beams and Channels, Iron or Steel.

Sheet Iron.—The demand is very irregular. Some mills appear to have plenty of work, while others report quite the reverse. Prices show similar irregularity, but for small lots, of best makes, quotations are about as follows:

Best Refined, Nos. 26, 27 and 28....3¼ @ 3½¢
Best Refined, Nos. 18 to 25....3 @ 3½¢
Common, ½¢ less than the above.
Best Bloom Sheets, Nos. 26 to 28....4¼ @ 4½¢
Best Bloom Sheets, Nos. 22 to 25....4 @ 4½¢
Best Bloom Sheets, Nos. 16 to 21....3½ @ 3¾¢
Blue Annealed.....2.8 @ 3 ¢
Best Bloom, Galvanized, discount.....62½ ¢
Common, discount.....67½ ¢

Merchant Steel.—The demand has fallen off somewhat since our last report, although the mills are well supplied with orders. Inquiries are numerous, more especially for the finer grades of Steel. Prices are firm at last week's quotations, viz.: Tool Steel, 8½¢; Machinery, 2.6¢; Crucible Spring, 4½¢; Open-Hearth

Ordinary Spring, 2.7¢ @ 2.9¢; Crucible Machinery, 5¢; Best Sheet Steel, 10¢; Ordinary Sheet, 8¢.

Steel Rails.—A better feeling is reported in this department, and it is thought that prices are held with more confidence. Sales have been chiefly in small lots at \$29 @ \$29.50, at mill, and \$29 is said to be an inside figure for the very best class of orders. There is more inquiry than usual, and the outlook generally is considered to indicate an early improvement.

Old Rails.—It is hardly worth quoting this market, as there are no Rails for sale, although it is likely that \$21.50 @ \$22 would be paid for T's, spot or to arrive. But there are none for sale at anything near these figures, so that buyers will probably fill their requirements elsewhere.

Scrap Iron.—Increasing firmness may be noted, with prices about as follows: \$19.50 @ \$20.50 for cargo lots; \$20.50 @ \$21 for carload lots, delivered, or for choice \$21.50 @ \$22; No. 2 do., \$14 @ \$15; Turnings, \$13 @ \$14; Old Steel Rails, \$19 @ \$20; Cast Scrap, \$14 @ \$15; do. Borings, \$9 @ \$10; Old Fish Plates, \$24 @ \$25. Old Car-Wheels, \$17 @ \$18, Philadelphia, or its equivalent.

Wrought-Iron Pipe.—Mills report a full complement of orders, and are likely to be well employed until the close of the year. Prices continue droopy, however, and it is difficult to quote with any degree of accuracy. Discounts are quoted as follows: Black Butt-Welded, 55 ¢; on Galvanized do., 45 ¢; on Black Lap-Welded, 65 ¢; on Galvanized do., 52½ ¢; on Boiler Tubes, 60 ¢.

Nails.—A very general improvement is noticeable in this department. Mills are all busy and their product is being marketed without ruinous cutting of price, which has been the custom for some months past. Orders for future delivery at present price are being refused, and with light stocks and increasing demand, manufacturers have some ground to expect an advance in price. At the moment lots from store are quoted at \$2, with the usual discount on carload lots.

Chicago.

Office of *The Iron Age*, 95 and 97 Washington St.,
CHICAGO, September 3, 1888.

Pig Iron.—The majority of furnace agents and dealers report a quiet week but a few are still enjoying a good trade. The latter class comprise those who have some brands of Iron to dispose of at current prices. They are being sought for by consumers who were disinclined to believe the reports they heard about the increased demand for Pig Iron and the hardening of prices. Some large buyers are included among the number, and their purchases have caused more furnace companies than were previously reported to retire from this market, having sold all the Iron they cared to place at present prices. Makers are undoubtedly attempting, though not through any concerted arrangement, to advance their rates, but the success of their efforts will depend on contingencies, prominent among which is the revival of the demand for all classes of material from the railroad companies. About Southern Coke and Lake Superior Coke Irons, however, there is no doubt, as prices have already been marked up. We quote for cash as follows: Lake Superior Charcoal, all numbers, \$19.50 @ \$20; Alabama Car-Wheel, \$26.25; Southern Charcoal Foundry, No. 2, \$18.50 @ \$20; Jackson County Softeners, No. 1, \$18.25 @ \$18.75; Hocking Valley, Soft Foundry, No. 1, \$17 @ \$18; American Scotch (Blackband) No. 1, \$18.50 @ \$19.50; other Ohio Scotch Irons, No. 1, \$17.50 @ \$18; Lake Superior Coke, No. 1, \$17.50 @ \$18.50; No. 2, \$16.50 @ \$17.50;

No. 3, \$15.50 @ \$16.50; Southern Coke, No. 2, \$17.75 @ \$18; No. 2½ and Open Bright, \$17 @ \$17.50; No. 3, \$16.50 @ \$17.

Bar Iron.—An undoubted improvement in the general demand leads to the presumption that the commencement of fall business has set in. Manufacturers' agents report numerous inquiries from miscellaneous consumers, and sales have been made at 1.70¢ @ 1.72½¢, f.o.b. Chicago, half extras, for Common Iron. The demand is largely local at present, but the upward tendency in prices will probably soon enlarge the circle of purchasers. Contracts for cars have been placed to some extent, and the consumption of Bar Iron is expected to show a decided increase in that direction very shortly. The quotations now being made by the mills are for immediate acceptance, everything in the nature of options having been withdrawn. Sales agents complain of the uncertainty which this condition of affairs imposes on them, as they are equally solicitous of protecting their customers and pleasing their principals. Jobbers quote 1.80¢ @ 2¢, from store, according to quantity and quality.

Structural Iron.—A good week's business has been done in bridge work. The heaviest single contract in this line was taken by the Chicago Forge and Bolt Company, who bid \$40,950 for the Fifth avenue approach to the Twelfth street viaduct in this city. Competing bids ranged from \$43,900 to \$48,789. The demand for Beams is declining with the approaching close of the building season. Prices are very firm at previous quotations, carloads of Angles from mill being held at 2.20¢, f.o.b. Chicago; Universal Plates, 2.30¢; Tees, 2.45¢; Beams and Channels, 3.40¢. Store prices are as follows: Angles, 2.40¢ @ 2.50¢; Tees, 2.60¢ @ 2.70¢; Beams, 3.80¢.

Plates, Tubes, &c.—Few mill orders have appeared in the market recently, but the jobbing trade has been very satisfactory. The territory covered by the Chicago dealers is growing again, restrictive influences, which were temporarily exerted, having disappeared. No changes in prices are reported, but the whole list is firm. Store prices are as follows: Heavy Sheets, Nos. 10 to 14, 2.65¢; Tank Iron, 2.55¢; Tank Steel, 2.80¢; Shell Iron, 3¢; Shell Steel, 3.25¢; Flange Iron and Steel, 4¢; Fire-Box Steel, 4.75¢ @ 5.75¢; Boiler Rivets, 4¢ @ 4.25¢; Ulster Iron, 8.75¢; Boiler Tubes, 60 % and 65 % off on 2½-inch and larger, according to specifications, and 62½ % off on 2-inch and smaller.

Sheet Iron.—Good-sized orders are still to be picked up in this market by mills able to handle them, but great difficulty is experienced in finding the mills willing to contract for deliveries earlier than November or December. Jobbers have again advanced their prices and now quote small lots of No. 24 at 3.30¢, Nos. 25 and 26 at 3.20¢ and No. 27 at 3.30¢, with a slight concession to best buyers.

Galvanized Iron.—Although manufacturers' agents report a sufficiently active demand to keep their stocks very low, and the mills are unable to increase their shipments in this direction because of a similarly strong demand from other districts, yet the price does not improve. It is expected that an upward movement will take place before long, however, if values of other Iron and Steel products continue to appreciate. Quotations are as follows for small lots: Juniata, 60 and 10 % off; Charcoal, 60, 10 and 5 % off.

Merchant Steel.—Nothing of special interest has occurred in this branch of trade. Stores report an excellent movement in small lots. They quote as follows: Bessemer Bars, 2.80¢ @ 2.40¢;

Tool Steel, 8½¢ @ 9½¢; Specials, 13¢ @ 25¢; Crucible Spring, 4.40¢; Open-Hearth Spring, 2.90¢; Open-Hearth Machinery, 2.75¢ @ 3¢; Crucible Sheet Steel, 7¢ @ 10¢.

Steel Rails.—Increased inquiry is reported, and a few sales of 500 to 2000 tons each have been made. The high price of Old Iron Rails has already induced some railroad companies, which have been practicing rigid economy this summer, to take up a considerable length of old track and relay it with new Steel Rails while they can be had at such low prices as are now ruling. The mills could probably sell many more Rails if they were not so manifestly eager for business. Their weakness inclines the railroad companies to defer purchasing until they are absolutely sure that the bottom has been touched. It is possible that they may hesitate too long, in view of the upward movement in prices of other Iron and Steel products. Quotations now range from \$30 to \$31, according to quantity.

Old Rails and Wheels.—The available supply of Old Iron Rails is quite limited. Although railroad companies are now taking up Old Rails quite freely, on account of their advance in price, a spirit of speculation has developed, and considerable quantities are being withdrawn from the market to be disposed of when higher figures are reached. It is reported that \$25.25 was refused by a dealer who expects to sell at \$26. Sales of several thousand tons were made earlier in the week between \$23 and \$24. Consumers insist that they will not pay more than this, but they so expressed themselves when Old Rails had advanced to \$20. Sales of Old Car-Wheels are reported at \$19, but they are not to be had in quantity at that price.

Scrap.—Consumers are looking about more freely for Forge Scrap, which is not in excessive supply, and they find dealers indisposed to sell more than moderate quantities, for which they ask higher prices. Some name \$20 for strictly No. 1 Railroad Shop, reporting actual sales at \$19.50, net ton. The demand for Mill Iron is fair. Cast and Steel Scrap are both quiet. Fish Plates are higher, in sympathy with Old Rails, sales having been made at \$20 @ \$20.50, net ton. Dealers offer \$13 @ \$14 for Mixed Country Scrap. Selling quotations for carefully selected are as follows, per ton of 2000 lb: No. 1 Forge or Railroad Shop, \$19 @ \$19.50; Track, \$18.50; No. 1 Mill, \$15 @ \$15.50; Light Wrought, \$11; Horseshoes, \$18; Axles, \$25; Cast Machinery, \$18.50 @ \$14; Stove Plate, \$11; Cast Borings, \$9; Wrought Turnings, \$11; Axle Turnings, \$13; Coil and Leaf Steel, \$16; Locomotive Tires, \$16.50.

Hardware.—The demand is good for both Shelf and Heavy Hardware, some houses reporting a steady improvement from week to week. Seasonable goods have moved off satisfactorily, including Tinners' stock, Stove Boards, Coal Hods and Stove Furniture generally. Carriage Bolts have been advanced 2½ %. Shot has also been marked up 10¢ per sack, \$1.40 now being asked from store.

Nails.—The advance in Cut Nails made by the Western Nail Association was immediately put in force in this market, agents asking \$2.02½, f.o.b. Chicago, for factory lots of Steel Nails. Both manufacturers' agents and jobbers had been enjoying an improved demand and the market was in good shape for an advance. A falling off in business was the immediate result, but this will probably only be temporary. As soon as it is apparent that the advance will be maintained buying will be resumed. Nails are now sold from store at \$2.10 for Steel and \$2.60 for Wire, which ought to be the price for carloads, with the present cost of factory lots.

Barb Wire.—A little movement is being felt by manufacturers and jobbers, but no large sales are reported. Nevertheless, a heavy fall trade is expected. Last year a good summer demand was experienced and no fall business. This year the conditions seem to be reversed. Prices are thoroughly demoralized. Painted is being sold at low as 2.90¢ from stock. This was brought about by the action of certain manufacturers, who cut Galvanized from the usual difference of 75¢ per 100 lb to 65¢. It immediately affected the price of Painted to the same extent.

Pig Lead.—Speculative buying has been the feature of the market here and in St. Louis the past week. One buyer is said to have absorbed nearly all the offerings, amounting to 2500 tons at both points. Prices at Chicago varied from 4½¢ early in the week to 4.60¢ @ 4.65¢ at the close.

Pittsburgh.

Office of The Iron Age, 77 Fourth Ave.,
PITTSBURGH, September 4, 1888.

The Iron and Steel industries in this district continue to improve; the volume of business is steadily increasing. Nearly all the mills are in operation, some of them working up to their full capacity, but the great trouble is to get up the prices of the products sufficiently to correspond with the greatly enhanced cost of production. Pig Iron has gone up \$2 @ \$3 per ton; Old Rails, \$3 @ \$4; Muck Bar, \$2.50 @ \$3, while Finished Iron as yet has not been advanced more than \$1 @ \$1.50 per ton. However, it is being advanced almost every day, and as long as the former continue to go up the latter will follow. In regard to the present boom the trade generally regard it as being regular and legitimate. Thus far there has been in this district an absence of speculation. There was some Pig Iron bought on speculation when the upward turn was first inaugurated early in July, but at present business in all branches of Iron and Steel is legitimate and is being conducted upon the law of supply and demand. Thus far there has been little or no improvement in the market for Steel Rails, and this is regarded as about the only weak spot apparent at present in connection with the present improvement.

Pig Iron.—The market is strong and considerably excited, and, since our last report, there has been a further advance of 50¢ to 75¢ per ton. Brokers report continued difficulty in finding sellers, as nearly all the furnaces in blast are sold from one to three months ahead; some of them have contracts that will absorb their entire product during the remainder of the present year, and they are feeling a little sore in regard thereto, as they could have done a good deal better by holding off, but they obtained full market price at the time. As compared with the lowest point, there has been an advance of \$2.20 to \$2.25 per ton on Mill Irons, and, while some well-posted operators are inclined to the belief that the zenith has been reached, others whose views are equally good look for still higher prices. There has been a decided improvement in the demand for Foundry Irons during the week under review, and it has been demonstrated that a good many foundrymen were caught napping. We quote prices as follows:

Neutral Gray Forge.....	\$15.75 @ \$16.50,	cash
All Ore Mill.....	16.75 @ 17.00,	"
No. 1 Foundry.....	17.00 @ 17.50,	"
No. 2 Foundry.....	16.25 @ 16.50,	"
No. 3 Foundry.....	15.50 @ 16.00,	"
No. 1 Charcoal Foundry.....	23.00 @ 24.00,	"
No. 2 Charcoal Foundry.....	21.00 @ 22.00,	"
Cold Blast Charcoal.....	25.00 @ 27.00,	"
Bessemer Iron.....	17.75 @ 18.50,	"

There were sales of Bessemer at \$18, cash, here and one lot reported at \$19, cash, delivered at East St. Louis. Sales

No. 1 All Ore Foundry Iron at \$17.50, cash, and All-Ore Mill at \$16.75 @ \$17, four months.

Muck Bar.—There is an active demand for Muck, with but little offering. As compared with the prices of a week ago, there has been a further advance of 50¢ per ton. So far as we have been advised there have been no sales above \$29, cash, but a further rise of 50¢ to \$1 per ton within the next week or so is expected.

Manufactured Iron.—The continued advance in Pig Iron is carrying Finished Iron up with it, and in the present condition of the market, with the raw article worth considerably more than the products, manufacturers are not disposed to make large contracts, especially for future delivery. Jobbers and large consumers, on the other hand, are anxious to anticipate future wants for the same reason that manufacturers are holding back, being apprehensive of higher prices. It is safe to say that there has been an advance of from \$1 to \$1.50 per ton on all kinds of finished Iron, and the indications are that prices will go higher, as they are still too low as compared with the cost of the raw material. Those mills using Old Rails fare still worse, as they have advanced considerably more than Pig Iron.

Nails.—There has been little or no improvement in the Nail trade as yet, and the outlook is not very encouraging. While we continue to quote card rates, and Pittsburgh makers are refusing to "cut" below, buyers, it is stated, are able to do better elsewhere. How it is that they can be sold below card rates, in view of a recent advance of \$1 per ton in the price of Nail Slabs, is one of those things that is hard to find out. Manufacturers here say they will let their factories stand idle before they will sell Nails at or below cost of production.

Wrought-Iron Pipe.—While there is not much of an improvement in the demand for Pipe, some of the mills are reported reasonably well employed, and the prices are firmer, owing largely to the enhanced cost of Pipe Iron. However, it is difficult to give reliable quotations, as each firm is still making its own rates, independently of each other. However, discounts have been reduced somewhat and are likely to go still lower, and this is causing an increased demand. General discounts on large lots appear to be 57½% on Black Butt-Welded, and 50% on Galvanized; 67½% on Black Lap-Welded, and 60% on Galvanized; Boiler Tubes, 65%; casing, 35¢ per foot net; 2-inch Oil-Well Tubing, 12½¢ net.

Old Rails.—The market continues strong, and with an active demand and very few to be had, prices have further advanced. We now quote at \$24 @ \$25 for American, an advance of \$1 to \$1.50 per ton. No sales reported. It is intimated that \$25 could probably be obtained for immediate delivery. At prices quoted foreign might be put here from the seaboard, but an advance there is probable, as it is claimed that they cannot be imported at present prices. In this market there has been an advance of \$3 to \$3.50 per ton within the past 60 days, and a good many consumers were caught napping—had no stock whatever.

Steel Rails.—There has been no improvement in the demand for Rails here, and \$30, cash, is still given as the nominal price, delivered at works. As Bessemer Iron has advanced \$10 per ton within a few weeks, it is evident that there is not much margin in Rails at present prices. It is possible that there will be an improvement before the close of the year.

Billets, &c.—Sales of Bessemer Steel Billets are reported at \$29, cash, on cars at makers' works, and the same quotation is made for Nail Slabs. Domestic Rail

and Bloom Ends quoted at \$18.50 @ \$19. Sale foreign Crop Ends at \$23.25, delivered in Pittsburgh.

Merchant Steel.—There is an improved demand, but no improvement as yet in prices. Best brands Tool Steel, 8½¢; Crucible Spring Steel, 4½¢; Crucible Machinery, 5¢; Open Hearth, 2½¢.

Railway Track Supplies.—Spikes are firmer. Splice Bars may now be quoted at \$1.85 @ \$1.90. Track Bolts unchanged at \$2.85 with Square and \$2.95 with Hexagon Nuts.

Old Material.—Of all kinds is in demand, firmer and higher, with but little offering. No. 1 Wrought Scrap, \$20 @ \$21 per net ton; Wrought Turnings, \$13.50 @ \$14; Car Axles, \$24 @ \$25; Cast Scrap, \$15.50 @ \$16, gross; Cast Borings, \$12 @ \$12.50; Old Car-Wheels, \$20, gross.

Detroit.

WILLIAM F. JARVIS & Co., under date of September 3, report as follows: The past week has shown an active market and the inquiries received certainly indicate that a general buying movement has set in, and this, taken in connection with the action of some of the Mahoning Valley furnaces, advancing prices from 50¢ to \$1 per ton, and not anxious for orders, even at the advance, shows that a decided advance is likely to take place at any time. Lake Superior Charcoal has taken the lead, and sales aggregating several thousand tons have been made. Some good sized orders for Southern Mill Iron have also been placed in this market. Old Car-Wheels are very hard to obtain, although some sales have been made at an advance of \$1.50 per ton over prices of a month ago. We report the market active and very firm and quote as follows:

Lake Superior Charcoal, all numbers.....	\$20.00 @ \$20.50
Lake Superior Coke, all ore.....	19.75 @ 20.25
Lake Superior Coke, cinder mixed.....	18.50 @ 19.00
Standard Ohio Black Band.....	19.75 @ 20.25
Southern No. 2.....	17.75 @ 18.25
Southern Gray Forge.....	16.25 @ 16.75
Southern Silvery.....	17.00 @ 17.50
Jackson County (Ohio) Silvery.....	18.50 @ 19.00
Old Wheels.....	20.00 @ 20.50

Cleveland.

CLEVELAND, September 3, 1888.

Iron Ore.—Nearly all varieties of Bessemer Ores have advanced from 25¢ to 50¢ per ton. A round lot of No. 1 Specular and Magnetic Bessemer Ore sold during the week for \$6.25 per ton, f.o.b. cars Cleveland, and high-grade Menominee Bessemer bring readily from \$5.10 to \$5.25 per ton. Gogebic Bessemer are so closely sold up that quotations are of little value, although a few scattering sales at \$5.15 @ \$5.30 are reported. Lake freights go bounding along upward, the Ashland rate having crept up from \$1.15 to \$1.60, the Marquette rate from \$1.05 to \$1.40, and the Escanaba rate from 85¢ to \$1.20. Because of this increased cost of transportation a few important negotiations remain unclosed. Buyers hesitate before paying the advance believed by the mine owners to have been made necessary by the heavier lake freights. This fact, together with the closely-sold-up condition of the market, especially in the matter of Bessemer Ores, has kept the volume of business below that of any former week for two months or more. The market, however, is far from dull. Enough Ore is changing hands, even at the advanced quotations, to insure a most thorough clearing up of the output. Quotations f.o.b. cars, lower lake ports, are as follows:

No. 1 Specular and Magnetic Bessemer Ore.....	\$5.75 @ \$6.25
No. 1 Specular and Magnetic Non-Bessemer Ore.....	5.00 @ 5.25
Red Hematite Bessemer Ore.....	5.00 @ 5.25

Red Hematite Non-Bessemer Ore....	4.00 @ 4.25
Menominee Range Bessemer Ore....	5.00 @ 5.25
Menominee Range Non-Bessemer Ore.....	4.00 @ 4.25
Gogebic Range Bessemer Ore.....	5.00 @ 5.25

Pig Iron.—A majority of the furnaces report sales from 60 to 90 days ahead of production. This heavy demand upon the furnacemen, and the anticipated scarcity, has had the effect of advancing quotations. Lake Superior Charcoal Irons are to-day quoted at \$20.50 @ \$21.50; No. 1 Strong Foundry, Bessemer Iron, \$18 @ \$18.50; No. 2 Strong Foundry, \$16.70 @ \$17.30; No. 1 American Scotch, \$18.25 @ \$18.70; No. 2 American Scotch, \$17.20 @ \$17.70; No. 1 Soft Silvery, \$17.50 @ \$18.50; Mahoning and Shenango Valley Neutral Mill Iron, \$15.50; Mahoning and Shenango Valley Red Short Mill Iron, \$16.

Scrap Iron.—A sale of 600 tons of No. 1 Wrought Scrap has occurred. Old American Rails are selling at \$22.25 and are in fair demand. The Board of City Improvements this morning sold the 70 tons of Old Iron from the Seneca street bridge to Swatzenberg Bros. for \$18 per ton.

Louisville.

LOUISVILLE, Ky., September 3, 1888.

Pig Iron.—The demand for Iron continues steady and holders are firm. Buyers, however, are hardly willing to pay the prices asked by some of the furnaces and are yet able to supply their wants at prices current during the last week. It is evident that if the Eastern market would advance in sympathy prices would improve at least 50¢ to 75¢. To advance, however, the West will have to carry the Ohio market, which has large quantities of Iron for sale, some furnaces having stacked large blocks of Iron during the last few months, preferring to hold rather than to sell. Advances from this district to-day show that they have felt the improved market and sales have been effected at increased prices over those current during the last ten days. Large blocks of Southern Iron have not been sold, as furnaces have not the Iron to spare, many of them having taken very large orders at prices current two months ago, and are not now in position to realize on the present market. Conservative furnacemen, who were not disposed to sell for a year's delivery, as was done in many instances, now are in excellent position to reap their reward. Old Rails have advanced strongly, and are now held at \$23 with offers of \$22.75. Old Wheels are in active demand at \$20.

Southern Coke, No. 1 Foundry.....	\$17.00 @ \$18.00
" No. 2.....	16.00 @ 16.50
" No. 2½.....	15.50 @ 16.00
Hanging Rock Coke, No. 1 Foundry.....	17.25 @ 17.75
Hanging Rock Charcoal, No. 1 Foundry.....	21.00 @ 23.25
Southern Charcoal, No. 1 Foundry.....	18.00 @ 18.50
Silver Gray, different grades.....	14.50 @ 15.25
Southern Coke, No. 1 Mill, Neutral.....	14.25 @ 14.75
" No. 2.....	13.75 @ 14.25
" No. 1 " Cold Short.....	13.75 @ 14.25
" Charcoal, No. 1 Mill.....	14.50 @ 15.75
White and Mottled, different grades.....	13.00 @ 13.50
Southern Car-Wheel, standard brands.....	23.25 @ 25.25
Southern Car-Wheel, other brands.....	19.25 @ 21.25
Hanging Rock, Cold Blast.....	23.25 @ 25.25
Hanging Rock, Warm Blast.....	19.25 @ 20.25

Chattanooga.

Office of The Iron Age, Carter and 9th Sts., CHATTANOOGA, September 3, 1888.

Pig Iron.—There can be no doubt that the prices of Pig Iron are steadily on the advance. One of the best evidences of this is the fact that parties who are not consumers are getting contracts of different furnaces for round lots of 250 to 500 tons, in some cases even larger, to be delivered when called for, in monthly installments, through the balance of the year. In some cases the money is paid down at the time of the contract, while other lots are to be

paid for as delivered, and nearly all are sold f.o.b. without commissions. There is hardly a producer in the South who is not on the alert and expecting better prices to rule during the balance of the year, and, having this in view, is very cautious about selling largely for future delivery. Nos. 2 and 3 Foundry appear to be the favorite grade that is being handled in this way and the result is that the selling agents of the different furnaces are frequently without stocks to offer consumers. Should this condition of things continue any length of time it requires but little foresight to see that prices will advance considerably during the balance of the year. There are absolutely no stocks of desirable grades in the yards of any of the furnaces, and the indifference of producers to sell even at present advanced prices must certainly act as a further incentive to stiffen prices.

Cincinnati.

CINCINNATI, September 3, 1888.

Pig Iron.—The local market for Pig Iron has continued active during the past week and a strong tone has prevailed, with higher prices realized. The aggregate sales for the past week were about 30,000 tons, including orders for Mill and Foundry grades, Southern and Northern makes, off qualities, as well as standard brands. But, while the business has been of varied character and transactions "scattered," a very large proportion of the trade has been in Forge Iron of some description. And, while the majority of sales have been of Southern production, there have been increased sales of Southern Ohio, Pennsylvania and Lake Superior Iron. A feature upon which dealers lay particular stress is that special brands will now command a considerable advance over the general market, although the level has been considerably advanced during the past few weeks. The fact, also, that Softeners, Mottled, and off grades sell so much more readily, and at full prices, is cited as of particular encouragement. No. 2 Southern Foundry Iron has been sold at \$16 @ \$16.50, mainly at \$16.25; No. 1 Mill, at \$15 @ \$15.25, and No. 2, do., at \$14.50 @ \$14.75; Mottled Iron at \$13.50 @ \$13.75. There has been less movement in Car-Wheel Iron, but a fair inquiry. Individual sales have been of larger amounts, a number of 1000-ton orders having been placed and some of greater magnitude, and the prospect is favorable for the fulfillment of negotiations now in progress of several 5000-ton lots. The following are the approximate quotations for the local market, cash, f.o.b. Cincinnati:

Hot-Blast Foundry.

Southern Coke, No. 1.....	\$17.50 @ \$18.50
Southern Coke, No. 2.....	16.50 @ 17.50
Southern Coke, No. 3.....	15.50 @ 16.00
Ohio Soft Stone Coal, No. 1.....	17.00 @ 17.50
Ohio Soft Stone Coal, No. 2.....	15.50 @ 16.00
Mahoning and Shenango Valley.....	17.50 @ 18.50
Hanging Rock Charcoal, No. 1.....	20.50 @ 22.50
Hanging Rock Charcoal, No. 2.....	19.50 @ 22.00
Tennessee and Alabama Charcoal, No. 1.....	18.50 @ 19.50
Tennessee and Alabama Charcoal, No. 2.....	17.00 @ 18.00

Forge.

Strong Neutral Coke.....	14.75 @ 15.00
Mottled Neutral Coke.....	13.50 @ 13.75
No. 1 Mill Coke.....	15.00 @ 15.25
No. 2 Mill Coke.....	14.50 @ 14.75

Car-Wheel and Malleable Irons.

Southern Car-Wheel.....	20.00 @ 23.00
Hanging Rock, Cold Blast.....	22.00 @ 25.00
Lake Superior Car-Wheel and Malleable.....	20.50 @ 21.50

Manufactured Iron.—The market has gathered more strength, with more encouraging orders for all kinds. Common Bar Iron, 1.90¢; Charcoal Bar Iron, 2.90¢ @ 3¢; Sheet Iron, Boiled, Nos. 10 to 27, 2.50¢ @ 3.25¢; Sheet Iron, Charcoal, Nos. 15 to 25, 3¼¢ @ 4¼¢ @ lb.

Nails.—There has been a quiet and easy market under free offerings without

essential change in prices. Jobbing prices are based upon 12d @ 40d, which sell at \$2 7/8 keg, with 10¢ rebate in carload lots, at mills. Steel Nails sell at \$2 and Steel Wire Nails at \$2.65 @ \$2.75 7/8 keg.

Old Material.—A strong and buoyant tone has prevailed with a further material advance in prices. The demand for Old Rails is especially urgent, with buyers at the close at \$23, while holders ask \$24. The demand for Old Wheels has been fair, and under a light supply prices have advanced to about \$21, but there has been no trade to establish the exact market.

New York.

Office of *The Iron Age*, 66 and 68 Duane street, New York, September 5, 1888.

American Pig.—What improvement there has been in this market during the past month may be summarized in the statement that cutting has ceased almost entirely. Occasionally reports come of prices being made slightly under the market; thus a round lot of Southern No. 2 Foundry has been sold at Sing Sing at \$16.75. Representatives of Ohio furnaces report that their principals are doing better in their own territory than the figures which can be realized in this State, and the Southern furnaces, too, are getting relatively better prices in the West. Production in the South will show an increasing tendency. Among the new furnaces just completed, which are to blow in during the current month, is one of the Sloss at North Birmingham; a second De Bardeleben, at Bessemer; the Gadsden, and one or more at Sheffield. There are a fair number of inquiries in the market and a moderate amount of business is being done, with some scarcity of No. 1 being reported. We quote for standard brands of Northern Irons, \$18 @ \$18.50 for No. 1 Foundry; \$16.75 @ \$17.50 for No. 2 Foundry, and \$15.75 @ 16.25 for Gray Forge.

Scotch Pig.—The market is very dull, prices being relatively too high, compared with American Iron, to allow of the use of Scotch Pig, except where founders still conservatively retain the belief that they cannot get along without it. We quote, nominally, Coltness, \$20 @ \$20.25; Langloan, \$19.25 @ \$19.50, and Dalmellington, \$19 @ \$19.25.

Ferromanganese.—Foreign has risen above the price at which Domestic can be bought at points in the Pittsburgh district and west of that point. We quote Foreign 80 %, \$50.50 @ \$51.

Bar Iron.—The advance of Mill Iron and Muck Bar in the West, and of Old Material, is likely to soon tell on both Refined and Common Iron, and the market is showing a firmer feeling now. We quote for carload lots, half extras, on dock, 1.57½¢ @ 1.65¢ for Common; 1.65¢ @ 1.7¢ for Medium, and 1.75¢ @ 1.9¢ for Refined.

Structural Iron.—There is a better feeling, although the volume of business in this section has not increased materially. The only large order on the market is the Springfield Bridge, calling for 1500 tons of Structural Material, which is to be let to-day. We quote for round lots, on dock: Sheared Plates, 2¢ @ 2.10¢; Universal Mill Plates, 2.10¢ @ 2.15¢; Angles, 2.1¢ @ 2.15¢; Tees, 2.5¢ @ 2.7¢ and Channels and Beams, 3.3¢.

Plates.—We quote for round lots, on dock: Iron Tank, 1.9¢ @ 2¢; Shell, 2.15¢ @ 2.30¢; Steel Tank, 2.25¢ @ 2.3¢; Shell, 2.4¢ @ 2.5¢; Flange, 2.7¢ @ 3¢, and Fire-Box, 3.7¢ @ 4¢. Galvanized Sheets are 65 ¢ @ 65 and 5 ¢.

Steel Rails.—The market continues dull, though some of the sellers express less anxiety concerning deliveries for the winter months. They claim that their

works are fairly busy in other directions, and that relatively they are getting better prices for Slabs, Billets, &c. While this may be true of some of the Eastern mills, the representatives of the leading Western works indicate that they have very little business in sight. While usually a considerable percentage of the orders finally booked are not counted upon long ahead, still there is a dearth of work in the Northwest, the only order talked of being for a road affiliated with the Northern Pacific, for 14,000 to 16,000. A good deal of financing of securities will have to be done before many Rails can be sold. The matter is one which deeply interests the entire Iron trade. Thus far raw material has advanced independently of the Rail trade, but it may well be questioned whether this movement can progress much further until a heavier demand for Rails sets in. Rail-makers generally confess that they see no hope for a rise in the market before a good deal of winter work has been placed and of that they see no signs as yet. How far behind this year's demand has been as compared with last is shown by the fact that up to August 1, 1887, the deliveries for the year were 1,045,048 gross tons. To the same date this year they were 710,502 gross tons. We continue to quote \$28.50 @ \$29 at Eastern mill for standard sections.

Blooms and Billets.—No business in foreign material is reported, prices being relatively too high.

Wire Rods.—Only small lots are being called for. We quote \$39.50 @ \$40.

Old Rails.—The only sales during the week have been 800 tons Bridge Rails and 200 tons foreign Tees at private terms. The market is very strong, with several large orders unfilled. The supply is limited here. It is estimated that the stock here is from 8000 to 10,000 tons, of which about 3500 tons are Double Heads. For a lot of the latter, ex-store, \$24, cash, has been declined, and nothing under \$25 is entertained, and then they are not offered firm at that price. Tees, in store here, are held at \$24, though it is believed that \$23.50 might be entertained. Private cables report the c.i.f. price of Doubles at 72/6, which is equivalent to \$24.50, without any margin to importer. The price quoted for shipment is \$25 for Doubles and \$24 for Tees. The market is excited, but business is restricted by the absence of stock. The holdings here are practically in the hands of four parties, among which is a banking house, while one lot of about 2600 tons is held by a Philadelphia firm, and one round lot is held on European account. We quote \$23.50 @ \$24 for Tees and \$25 for Double Heads.

Track Material.—The advance in Old Rails has caused a stiffening in Spikes. Offers are being withdrawn, and agents have instructions not to sell anything above very small lots, which are quoted \$2.15, before submitting orders to their principals. In Angle Bars a firmer tone also prevails.

The Pottsville Iron and Steel Company, of Pottsville, Pa., have appointed Charles C. Loring, No. 4 Liberty Square, Boston, Mass., their agent, in place of A. G. Tompkins, for the sale of their Beams, Channels, Angles, Tees and Plates in the Eastern States.

Metal Market.

Copper.—In London the speculators have run up during the week spot Chili bars all the way to £95, while futures improved to £79. 5/ and are now £79. Good merchantable brands have advanced to £76. 10/, and Best Selected has risen to £80. As the visible supply in England and

France on the 1st inst. has increased to 84,140 tons, against 75,474 on August 1, a difference of 8,666 tons, this is about as bad a show as can be made, hence the above advance to £95 can only be the result of manipulation foreign to the real position of the metal, and this explains the apathy here in the face of the said rise. Our market has been pretty much stagnant, and is quoted this morning 16.10¢ for spot and September nominally. A dispatch was received here by one of the daily papers from Boston to the effect that the syndicate was taking steps to extend its contracts with mining companies on this side from three years to 12, upon condition of the companies reducing their present output 20 %, so as to prevent accumulation of stock, inevitable in view of the steady falling off in consumption. The Anaconda will be open for a new contract, to date from January 1 next, and this piece of news may have been started as a feeler. Or perhaps it is a mere Boston Copper stock-jobbing "canard" to influence the market for stocks favorably. Rio Tinto shares rose 20 francs in Paris last week.

Tin.—London suddenly rose last week £5. 10/ per ton with spot Tin, and £6. 5/ with futures, the outstanding short interest to be covered being supposed to be so large as to favor this unexpected improvement—unexpected, because there was an impression that the statistics, in consequence of heavy Eastern shipments, would prove anything but encouraging. These statistics are, indeed, not of a stimulating nature, the visible supply on September 1 in Europe and America being 12,740 tons, against 13,966 on August 1, a decrease of only 1226 tons. Last year on September 1 it was 11,573 tons, and 11,690 on September 1, 1886. London came £97. 7/8, spot, yesterday, but is again £98. 2/8 to-day, while futures rose from £97. 17/8 to £98. 12/8. Here, last week some 40 tons were taken at 21.10¢ @ 21.90¢, and this week 20 tons. September at 21.90¢ @ 22¢, 75 tons October selling to-day at 22.15¢, 22.20¢ and 22¢, the latter the last transaction, the market winding up quiet at 22.15¢, spot. As per cable message from Gilfillan, Wood & Co., Singapore, to Mr. Charles Nordhaus, New York, September 1, the August shipments this way were 300 tons, against 750 last year; to England, 1800, against 1300; since January, respectively, 1450, against 3550, and 12,400, against 8800. **Tin Plates.**—The scarcity of Coke Tins continues, and under a good demand the quotation, as shown at foot, is slightly higher. Other descriptions also move off to a fair extent on the spot; futures sell with ease at figures somewhat below spot prices. Liverpool, meanwhile, exhibits great strength. We quote toward the close, large lines, per box, on the spot: Siemens-Martin Steel, charcoal finish, \$4.85 @ \$5.25; Coke finish, \$4.75; Ternese, \$4.30 @ \$4.40; Bessemer Cokes, \$4.60 @ \$4.65, and Wasters \$4.20 @ \$4.25; Liverpool is 13/8 with Coke Tin.

Lead.—During the week some 2000 tons have again been taken by speculators in the open market and on the Exchange, taken together, at up to 4.95¢. Consumers have bought absolutely nothing, and they at their late meeting have not even advanced prices, nor have White-Lead manufacturers, the demand for all these Lead manufactures being too slack to warrant higher prices, and thereby perhaps interfere with the expected fall demand still to come. At St. Louis 500 tons were purchased for New York at 10¢ above the price it can be laid down here with 20¢ freight, the quotation there being 4.65¢. At the close 4.92½¢ has been bid and 5¢ asked, 100 tons November having sold to-day at 4.85¢. The entire speculation seems unreasonable and is looked upon by the trade as very risky. In London Soft Spanish ad-

vanced from £13. 10/ to £13. 12/6; it costs 5.05¢ duty paid to lay it down here, and English Pig is cabled £13. 16/. As for the so-called European Lead syndicate in embryo, the report is that the committee appointed to frame the by-laws for the same has not yet finished its labors, some leading producers still rustivating. A common selling office seems to be discarded from the very start, not being deemed practicable.

Spelter.—At the advances insisted upon Common Domestic does not sell very readily, but is dragging at 4.80¢ @ 5¢, while Silesian cannot be had for less than 5.70¢, having risen to £18 in London. Advances are favorable from Silesia, where a brisk trade is being transacted.

Antimony.—Hallett is cabled £38; here a moderate jobbing demand is noticeable at 9½¢ for Hallett and 13¢ @ 13½¢ for Cookson.

New York Metal Exchange.

The following sales are reported:

THURSDAY, August 30.		
10 tons Tin, spot	21.10¢	
10 tons Tin, spot	21.20¢	
25,000 lb Copper, August	16.90¢	
32 tons Lead, September	4.82½¢	
100 tons Lead, September	4.85¢	
50 tons Lead, October	4.85¢	
32 tons Lead, spot	4.87½¢	
FRIDAY, August 31.		
10 tons Tin, September	22.00¢	
100 tons Lead, September	4.85¢	
80 tons Lead, September	4.87½¢	
10 tons Lead, October	4.90¢	
100 tons Tin, September	21.90¢	
16 tons Lead, spot	4.90¢	
96 tons Lead, spot	4.95¢	
200 tons Lead, September	4.85¢	
100 tons Lead, September	4.87½¢	
16 tons Lead, September	4.95¢	
100 tons Lead, October	4.90¢	
50 tons Lead, spot	4.97½¢	
TUESDAY, September 4.		
112 tons Lead, November	4.90¢	
10 tons Tin, September	21.90¢	
10 tons Tin, September	22.00¢	
532 tons Lead, October	4.95¢	
WEDNESDAY, September 5.		
20 tons Tin, October	22.15¢	
30 tons Tin, October	22.20¢	
25 tons Tin, October	22¢	
100 tons Lead, November	4.85¢	

Coal Market.

The Anthracite trade is active, and the recent advance is said to be firmly held. Production at the mines is still in large volume, the total for the week ending September 1 having been 844,665 tons, as compared with 596,369 tons for the corresponding week in 1887, an increase of nearly 250,000 tons, but the output is not quite equal to that of the middle of August. Since January 1 the aggregate is 23,950,114 tons, or an increase of more than 1,250,000 tons as compared with the same time last year. The output for several weeks past is as follows:

	Tons
Week ended August 4	754,883
Week ended August 11	831,615
Week ended August 18	920,922
Week ended August 25	832,058
Week ended September 1	844,665

On the 1st inst., when the advanced prices took effect, the several companies, as a rule, fell back on their reserved privilege and proceeded to fill unfinished orders at the "rates current at time of delivery." Operators and shipping companies in reference to complaints that the advance was unnecessary, are represented as saying that they "have been taxed to their utmost for more than a month to fill the orders for coal they have received even at the high prices which have recently been ruling, and that the situation warranted increased prices and tolls."

New York prices are as follows:

	Broken.	Egg.	Stove.	Cnut.
Hard white ash	\$4.15	\$4.40	\$4.65	\$4.55
Free white ash	3.95	4.20	4.45	4.55
Lykens Valley	5.00	5.50	5.50	5.25

Pea has sold as low as \$2, this size being in excess. Cargo prices, free on board at

New York, compare with those of a year ago, as follows:

	August, 1887.	August, 1888.	Inc.
Broken	\$3.65	\$3.85	\$0.20
Egg	3.80	4.15	.35
Stove	4.25	4.50	.25
Chestnut	3.85	4.40	.55

The Philadelphia *Ledger* says: "The new prices for Anthracite are being firmly maintained at about the full circular figures, and 'shopping' for Coal to get a shade off the circular prices is a thing of the past. Some Coal shippers are asking, Where is all the Furnace Coal going to? saying it puzzles them to know, as there are so many iron furnaces idle and that some of those in blast are using Coke, and yet there is no visible surplus of Lump and Broken sizes, notwithstanding the enormous output of Coal this year. The production of Lykens Valley Coal, which has been limited for several months, is increasing, and on Thursday Graef, Wilcox & Co. and Graef, Miller & Co. resumed operations in the Lykens Valley region."

Bituminous Coal is in rather better demand, and the tonnage steadily increases. Clearfield production for the week was 65,897 tons, and for the year since January 1, 2,129,000 tons, against 2,011,000 for the same time in 1887; Cumberland do. for the week, 74,728 tons, and since January 1 2,195,000 tons; increase 240,000 tons. The Philadelphia *Record* says: "The short-sightedness of the policy of the Anthracite Coal managers in keeping up the price of that article is shown in the fact that the supply of Bituminous Coal for the seaboard has increased so far this year 1,700,000 tons, while the amount of Anthracite is almost the same as for 1887. The exorbitant price and the difficulty of getting full supplies have led some large manufacturer in this city to give up Anthracite Coal entirely and to use Bituminous in its place. Nearly the whole gain of the Anthracite producing companies is in their Western trade, and on this they levy such heavy tolls that there seems a possibility that they may kill that also. The price in Chicago is now over \$9 per ton, and has led to a lively kick there against the extortion of the Coal companies."

The shipments of Anthracite Coal to the West by lake from Buffalo are the largest on record and aggregate 313,000 tons for the month and 1,406,000 tons for the season.

Imports.

The imports of Iron and Steel, Hardware, &c., at this port from August 13 to August 30, inclusive, and from January 1 to August 30, inclusive, were as follows:

		Aug. 13 to Aug. 30.	Jan. 1 to Aug. 30.
		Tons.	Tons.
Iron Ore: A. Earnshaw			
A. C. Outerbridge	228	6,389	
Pig Iron: A. Milne & Co	1,668	2,527	
Crocker Bros	50	7,873	
N. S. Bartlett	400	3,800	
James Williamson & Co.	400	3,600	
Naylor & Co.	870	5,984	
G. W. Stetson & Co.	250	11,960	
Jas. E. Pope, Jr.	150	150	
Peter Wright & Sons	20	20	
C. L. Perkins	5	5	
Steel: W. F. Wagner			
A. Milne & Co.	55	1,065	
R. H. Wolff & Co.	54	1,011	
F. S. Pilditch	25	367	
Chas. Hugill	16	312	
C. F. Boker	14	207½	
M. Strouse & Co.	13	172½	
J. Abbott & Co.	12	30	
M. Cohn & Co.	12	365	
Newton & Shipman	9	178	
C. S. Mersick & Co.	6	121	
H. W. Belcher	4	12½	
Thos. Prosser & Son	2	7	
Spiegeleisen: Crocker Bros.	484	3,420	
Dana & Co	900	1,401	
Naylor & Co	1,246	6,519	
C. L. Pierson & Co.	15	60	
Steel Rods: Naylor & Co.	1,028	14,267	
Dana & Co.	300	2,060	
S. A. Galpin	268	2,570	
J. Abbott & Co.	125	3,840	
R. H. Wolff & Co.	75	2,997	

A. Heyn.....	48	1,289
Cary & Moen.....	25	650
Steel Blooms: Dana & Co.....	125	102
Steel Sheets: Pierson & Co.....	215	836
Naylor & Co.....	41	468
Steel Billets: J. Abbott & Co.....	141	1,488
Steel Plates: A. R. Whitney & Co.....	12	12
Steel Hoops: Jas. Lee & Co.....	45	45
Ogden & Wallace.....	29	29
Wheelock & Co.....	10	220
Steel Forgings: Thos. Prosser & Son.....	218	3,448½
Steel Bloom Ends: Dana & Co.....	745	947
Steel Tubes: Thos. Prosser & Son.....	2	2
Steel Tires: Thos. Prosser & Son.....	60	60
Steel Rails: Delaware, L. and W. R. R. Co.....	85	1,148
Scrap Steel: A. Milne & Co.....	25	102
Naylor & Co.....	2	174
Iron: G. Lundberg.....	251	588
Bacon & Co.....	107	130
R. F. Downing & Co.....	3	28
E. G. Jacobus.....	270	545
Iron Rods: Naylor & Co.....	300	3,029
Rivet Rods: J. Abbott & Co.....	150	448
G. Lundberg.....	150	212
R. F. Downing & Co.....	134	304
A. Milne & Co.....	54	788
J. A. Roebeling's Sons.....	3	43
Page, Newell & Co.....	70	985
Sheet Iron: T. B. Coddington & Co.....	10	10
R. Crooks & Co.....	100	495
Screw Rods: American Screw Co.....	211	601
Iron Beams: W. H. Wallace & Co.....	62	256
R. F. Downing & Co.....	27	394
Iron Girders: R. F. Downing & Co.....	10	10
Steel Sheets: A. Milne & Co.....	100	200
Scrap Iron: Bowering & Archibald.....	8	8
Tee Iron: Stroud & Co.....	5	5
E. G. Jacobus.....	101	128
Charcoal Iron: Muller, Schall & Co.....	10	36
Iron Wheels: R. F. Downing & Co.....	300	645
Cotton Ties: Naylor & Co.....	150	150
Bullard & W.....	50	180
Wheelock & Co.....	419	1,940
J. S. Leng's Sons.....	103	275
Steel Crop Ends: Naylor & Co.....		
Ferromanganese: Naylor & Co.....		

Tin Plates.

	Boxes.	Boxes.
Phelps, Dodge & Co.	40,783	362,511
Dickerson, Van Dusen & Co.	16,833	183,139
Pratt Mfg. Co.	14,321	120,564
T. B. Coddington & Co.	10,768	118,635
A. A. Thomsen & Co.	9,149	81,565
R. Crooks & Co.	4,801	47,801
G. B. Morewood & Co.	4,629	31,939
Bruce & Cook	4,437	70,022
Jas. Byrne & Son	3,408	26,298
N. L. Cort & Co.	3,280	72,285
H. V. Whittemore & Co.	2,521	43,485
Central Stamping Co.	2,036	21,977
Lombard, Ayres & Co.	1,554	10,272
H. R. Demitt & Co.	1,029	14,319
Wolff & Roessing	964	21,306
Lalance & G. Mfg. Co.	810	3,378
E. S. Wheeler & Co.	789	4,653
S. Shepard & Co.	615	13,836
Somers Bros.	400	300
Merchant & Co.	206	16,483
Henly & Earle.	38	38

Metals.

	Pounds.	Pounds.
Tin: Muller, Schall & Co.....	660,047	8,121,313
R. Crooks & Co.....	212,824	233,633
Naylor & Co.....	212,748	1,710,411
Phelps, Dodge & Co.....	179,193	1,338,314
American Metal Co.....	78,320	990,696
Jas. E. Pope, Jr.....	78,180	192,598
D. Thomsen & Co.....	22,454	159,623
Nickel: McCoy & Sanders.....	15,120	137,610
Spelter: J. Macy's Sons.....	50,000	50,000
Lead: Hendricks Bros.....	44,352	44,352
	Casks.	Casks.
Antimony: Edw. Hill's Sons & Co.....	200	1,175
American Metal Co.....	60	155
Hendricks Bros.....	34	170
Phelps, Dodge & Co.....	30	440
Dickerson, Van Dusen & Co.....	17	51

Hardware, Machinery, &c.

Brown Bros. & Co., cutlery, cs., 4	
Barbour Bros. & Co., Mach'y, cs., 8	
Blake, G. J. Mfg. Company, Iron Heater, 1	
Boker, Hermann & Co., Mdse., cs., 10; Arms, cs., 14; Hdw., cs., 9	
Corbeire, Fellows & Co., mach'y, pkgs., 19	
Capen, A. M., mach'y, pkgs., 8	
Clark Mill Company, Mach'y, cse., 1	
Erie Despatch Company, Cistern, 1; Mach'y, cs., 21	
Field, Alfred & Co., Mdse., cs., 14; Hdw., cs., 10	
Folsom, H. & D., Arms, cs., 10	
Graef Cutlery Company, Cutlery, cs., 8	
Hammacher, Schlemmer & Co., Nails, cs., 40	
Hartley & Graham, Arms, cs., 20	
Hawley Bros. Hardware Company, Mdse., cs., 3	
Hertlein & Schlatter, Mach'y, cs., 4	
Kastor, A., Mdse., cs., 6	
Lundberg, G., Ironware, bxs., 13	
Meacham Arms Company, cs., 10	
Merchants' Despatch Company, Arms, cs., 14; Ironware, box., 1; Arms, cks., 7	
McSorley, G. & Son, Mach'y, cs., 4	
Neal, C., Hdw., ck., 1	
Ritchie, R. O., Mach'y, pkgs., 9	
Schoverling, A., Arms, cs., 35	
Shoverling, Daly & Gales, Arms, cs., 21	

Schloss & Sons, Mach'y, cs., 2
 Sheldon, G. W. & Co., Hdw., cs., 7; Chains, cks., 9
 Sloane, W. & J., Castings, 4
 Stoddard, Lovering & Co., Mach'y, cs., 2
 Tryon, E. K. J. & Co., Arms, cs., 9
 Tully, H. A., Hdw., cs., 4
 Taylor, Thos., Hdw., cs., 2
 Van den Toorn, W. H., Arms, cs., 26
 Ward, Asline, Mdse., cs., 6
 Wiebusch & Hilger, Lim., Mdse., cs., 31
 Weiller, Strauss & Co., Hdw., cs., 4
 Witte, John G. & Bro., Cutlery, cs., 9
 Order: Mach'y, pkgs., 13; ditto, cse., 1

Exports of Metals.

	August 13.	Jan. 1. to August 30.
	Pounds.	Pounds.
Copper: J. Abbott & Co.....	50,000	10,053,619
Lewisohn Bros.....	343,845	3,929,022
F. A. Lomal.....		2,581,235
American Metal Company.....		5,148,085
G. H. Nichols.....		223,639
J. Bruce Ismay.....		112,000
S. Mendel & Co.....		560,000
Ledoux & Co.....		110,276
Muller, Schall & Co.....		430,000
Copper Queen Con. M. Com-pany.....		224,034
J. Kennedy, Tod & Co.....		112,025
H. Becker & Co.....		1,250
Orford C. & S. Rfg. Company.....		449,881
Robt. M. Thompson.....		125,000
Thos. J. Pope, Sons & Co.....		822,130
J. Parsons & Co.....		206,250
Bridgeport Copper Com-pany.....		112,000
C. Herold.....		250,000
Phelps Bros.....		6,250
R. W. Jones.....		189,084
W. H. Crossman & Bro.....		4,000
Copper Matte: Williams & Terhune.....	789,521	34,382,598
Lewisohn Bros.....		3,021,610
American Metal Company.....	301,932	2,236,873
J. Abbott & Co.....		295,000
C. Ledoux & Co.....		485,800
F. W. J. Hurst.....		184,288
G. H. Nichols.....		722,777
H. T. Nichols & Co.....		180,995
Kunhardt & Co.....	41,652	41,652
Copper Ore: C. H. Mallory & Co.....	204,747	204,747
Old Copper: Burgess & Co.....	41,694	554,968
Old Brass: Burgess & Co.....	15,705	240,395
Pig Iron: Peter Wright & Son.....	180	180

Financial.

The business situation and hopeful outlook have not been adversely affected by any of the events of the past week. Crop accounts are no less flattering, and the industries through the entire range are without disturbance, and to all appearances are at least moderately prosperous. The exemption from labor troubles is at least worthy of notice. In the cotton industries there are a number of new mills building, especially in the South, and woolen mills are more active. Glass manufacturers, as is usual at this season, are starting again. Railroad tariffs are not yet altogether on a settled basis. Chairman Cooley, of the Interstate Commerce Commission, on his attention being called to the dispatch from Chicago regarding rates over the Southern Pacific road, said it is not in the power of the traffic manager to make rates between New York and Pacific Coast points as low as he pleases and at the same time put rates between interior towns and the Pacific Coast as high as he pleases. There are considerations of relative equality and justice that cannot be ignored and that have been kept steadily in view in all that the commission has said in its ruling hitherto. They will be kept just as steadily in view hereafter.

The Stock Exchange markets were dull but generally strong. Lackawanna after an advance of about 8% within ten days, was a fraction lower. The grangers were regarded with more confidence since the decision by Judge Fairall in the case of the Rock Island Railroad against the Iowa State Commissioners. His decision is identical with that of Judge Brewer in the cases recently reported, and is, in brief, that the commissioners are not empowered to fix the rates so low as to prevent the carrier from receiving a reward for the services rendered, and that in doing so the commissioners became wrongdoers, "for the reasons that their acts were in violation of the commands of the statute that required them to make just and reasonable rates, and in violation of

the constitutional provisions which restrain the State as well as its officers from making and attempting to enforce by law rates which were not compensatory." On Friday the denial of the report about the probable disruption of the Trunk line pool had a favorable effect, and there was less disposition than expected shown to sell on account of the Retaliation bill proposed in the House. The Saturday half-holiday and the holiday on Monday made trading small. On Tuesday there was a gradual rise in the Oregon, Northern Pacific, Reading and Lackawanna, and the tendency was generally upward to near the close, when there was an irregular decline. It was reported that a through route from the West to Baltimore, Philadelphia and New York via the Baltimore and Ohio Railroad has at last been effected. The Pennsylvania Railroad, it is said, will not offer opposition to the deal just consummated. The Reading Railroad Company has decided to widen all its tunnels and to widen and improve its tracks in order to increase its freight carrying capacity.

United States bonds are quoted as follows:

U. S. 4½s, 1891, registered.....	106½
U. S. 4½s, 1891, coupon.....	107½
U. S. 4s, 1907, registered.....	129½
U. S. 4s, 1907, coupon.....	129½
U. S. currency 6s.....	120

The total bank clearances last week in 38 cities show a decrease of 16.4 per cent. compared with last year, against an increase of 1.4 per cent. the previous week. Clearings outside of New York show a decrease of 1.5 per cent. as compared with last year, against an increase of 9.6 per cent. the previous week. The loss at New York was exceptionally large, and must be mainly ascribed to dullness in speculation.

Higher prices for wheat and breadstuffs, caused by bad weather reports from Europe, have been succeeded by an easier feeling and irregular prices, with a light business. There was great excitement on Tuesday in wheat. Owing to the unfavorable reports from the crops, the price reached \$1.04½ and closed at \$1.04½, as against \$1.01 on Saturday. Compared with a week ago, wheat is ½¢ @ ¾¢ lower. Corn is a shade lower, but about steady. Provisions were raided in Chicago, but in New York were quiet. In the grocery trade sugars were higher, both raw and refined. Coffee is unsettled. Cotton closed steady, and spots were reduced ½¢ to confirm nearer to the September options. Active business was done at 10½¢ @ 10½¢. The new crop was somewhat weaker as a result of favorable crop reports. The rise in the price of jute bagging is said to be delaying deliveries. Ocean freights touched a higher point than before for a long while, but advanced prices for commodities generally have kept exports within narrow limits. Among dry goods jobbers there was a marked improvement, especially noticeable in New York, and alike satisfactory as reported from other seaboard markets.

The weekly bank statement showed the first heavy drain to move the crops, the demand from the South having been delayed by late cotton. The surplus reserve was reduced over \$4,200,000, so that the excess now stands at \$16,766,625, as against \$5,200,000 at the corresponding week last year and nearly \$7,000,000 a year before. Specie showed a decrease of \$4,397,800. In loans the expansion was larger than the previous week, amounting to \$2,983,900. Taken altogether the statement bears out the reports in regard to increased activity in general trade, and the loss in surplus reserve, although large, occasions little surprise at this season of the year.

Commercial paper was in fair supply, but the demand was not urgent. Rates were

for 50 to 90 days' indorsed bills receivable $4\frac{1}{2}$ to 5 %; for first-class four months' commission house names $4\frac{1}{2}$ to $5\frac{1}{2}$ %, and for good single names $5\frac{1}{2}$ to $6\frac{1}{2}$ %. Banks are discounting little except for their own customers. Sterling exchange is dull at $\$4.95\frac{1}{2}$ @ $\$4.88\frac{1}{2}$, the same as for the previous week. The supply of cotton bills is a little better. The Bank of England rate remains at 3 %, against 4 % at this date last year. The gross earnings of 74 railroads for the third week in August show an increase compared with last year, when they were considered remarkably favorable. The *Daily Stockholder* reports interest and dividend payments during the month of September of $\$17,363,328$, against $\$15,077,038$ for the corresponding month last year. In addition to this, however, the Government has paid $\$2,500,000$ for quarterly interest on $4\frac{1}{2}$ % bonds. The exports of specie from this port last week were $\$504,000$; imports nominal.

The imports of merchandise at this port during the week were valued at $\$8,667,365$, of which over $\$3,000,000$ represents dry goods. Since January 1 the aggregate is $\$317,372,000$, as compared with $\$319,107,000$ for the same time last year, and of $\$293,689,800$ in 1886.

The *American Banker* states some interesting facts respecting the increase in the number of banks in different parts of the country during the first half of the current year. The whole number of new banks organized during that time was 522, against 267 during the first half of 1887. The amount of their capital was $\$27,014,150$, or an average of less than $\$52,000$ each, against $\$23,427,200$ during the same time last year, or an average of over $\$87,700$ each. The most of these new banks were organized in the Southern and Western States.

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, Sept. 5, 1888.

Parties who sold Chili Bar futures "short" some time ago, on which deliveries became due within the past week, have been given a practical lesson in what the "syndicate" is capable of doing in the way of making an artificial stringency. In fact, the "shorts" have been severely squeezed and had to pay as high as $\$93$ @ $\$95$ for cash warrants, whereas futures have ruled at about $\$79.10$ / and $\$8$ M. B. contracts at $\$76.10$ /. Meanwhile consumers have been supplied, on certain conditions, with Chili Bars at $\$78.10$ / for prompt delivery, or $\$15$ @ $\$17$ below the prices which the "shorts" have been obliged to pay on the open market. Surface indications fail to reflect any material increase in the amount of Copper passing into consumption. To the contrary, the actual deliveries are not above a full average amount and surplus supplies continue to rapidly increase on the hands of the syndicate. It is now estimated that the syndicate holds no less than 100,000 tons of various Copper in England and France in addition to the extensive quantity of American product in the American market. It is stated that the officials of some of the mining companies are becoming alarmed at the rapid accumulation of surplus stocks and talk of the propriety of measures being taken to reduce the output. The chairman of the Bratsberg Company, it is stated, remarked at a recent meeting that he believed a crash to be certain unless the mine owners combined to curtail production. There

has been a quite extensive business in furnace material the past fortnight, and, in all instances, at firm prices. James Lewis & Sons' circular notes, among other sales, 1750 tons Anaconda Matte at $15\frac{1}{2}$ ¢, f.o.b. Liverpool, and 34 tons American Precipitate at the same price.

The Block Tin market has fluctuated widely under the influence of active speculation, with both "bulls" and "bears" striving for supremacy. The Dutch interest is believed to favor those traders whose operations are for a rise, and the result of the Batavia sale of Billiton tended to strengthen the impression. The sale realized an equivalent of $\$101$ delivered in Holland, and the first announcement of the result caused considerable excitement, particularly among the smaller traders who stood "short" on the market.

The Tin-Plate market continues very strong. Production is still closely taken up, and in view of this fact, together with the advance on Block Tin and Iron, nearly all makers are holding for still higher prices. There has been a misunderstanding between the proprietors of Margam Works (Port Talbot, Glamorganshire) and their employees, resulting in a temporary stoppage of work at their nine mills.

The demand for Scotch Pig Iron has continued active and prices show a still further hardening. Middlesboro' product has also also undergone a further advance on large transactions, and large sales are reported of Hematites also. It is stated that about 1000 tons Middlesboro' Pig were sold for the American market, the first transaction of the kind in several months. The advance in prices during the week is 6d. to $1\frac{1}{8}$ on Scotch Pig, $1\frac{1}{8}$ on Hematites and 6d. on Middlesboro'. Spiegeleisen is offered somewhat lower. Steel Rails, Blooms, Billets, &c., are held higher, owing to the advance on crude material. Old Iron Rails are also $2\frac{1}{8}$ higher, and steamer freights have advanced $2\frac{1}{2}$ @ $3\frac{1}{2}$.

Scotch Pig.—The market strong at the advance and active.

No. 1 Coltness, f.o.b. Glasgow	50/
No. 1 Summerlee, " "	51/
No. 1 Gartsherrie, " "	47/8
No. 1 Langloan, " "	47/8
No. 1 Carnbroe, " "	43/
No. 1 Shotts, " at Leith	47/8
No. 1 Glengarnock, " Ardrossan	45/3
No. 1 Dalmeilington, " "	42/8
No. 1 Eglinton, " "	41/8

Steamer freights, Glasgow to New York, $8\frac{1}{2}$ @ $9\frac{1}{2}$; Liverpool to New York, $10\frac{1}{2}$.

Cleveland Pig.—Bessemer has been brisk and prices show a further 6d. advance. No. 1 Middlesboro', G.M.B., $37\frac{1}{2}$; No. 3 do., $34\frac{1}{8}$.

Bessemer Pig.—There has been a large trade and the market is very strong. West Coast brands, mixed numbers, $45\frac{1}{8}$, f.o.b. shipping point.

Spiegeleisen.—The demand very slow and prices rather easier. English $20\frac{1}{2}$ quoted $75\frac{1}{2}$, f.o.b. N. W. England shipping point.

Steel Rails.—Moderately active demand and prices held higher. Standard sections quoted at $\$3.18\frac{1}{9}$, f.o.b. at N. W. England shipping point.

Steel Blooms.—More business doing and the market firmer. We quote $\$3.15$ / for 7×7 , f.o.b. at N. W. England shipping point.

Steel Billets.—A quiet, active trade, and prices somewhat higher. Bessemer, $2\frac{1}{2} \times 2\frac{1}{2}$ inch, $\$4$, f.o.b. at N. W. England shipping point.

Steel Slabs.—Prices are held higher, but there is less doing. Bessemer, $\$3.17\frac{1}{8}$, f.o.b. at N. W. England shipping point.

Steel Wire Rods.—Demand rather slow but prices held firmly. Mild Steel No. 6 quoted at $\$5.18\frac{1}{9}$ and No. 5 at $\$5.25\frac{1}{2}$, f.o.b. at N. W. England shipping point.

Old Rails.—Supplies sparingly offered. Demand is larger. Tees quoted at $\$2.17\frac{1}{8}$, and Double Heads $\$3$, free on board.

Scrap Iron.—There is more demand and prices are firmer. Heavy Wrought quoted at $\$2.5\frac{1}{2}$, f.o.b.

Crop Ends.—More business doing and prices are firmer. Bessemer quoted $\$2.7\frac{1}{6}$ @ $\$2.10\frac{1}{2}$, f.o.b.

Tin Plate.—The market firm with fairly good demand.

Manufactured Iron.—There continues to be an active business and prices are strong. We quote, f.o.b. Liverpool:

	£	s.	d.	£	s.	d.
Staff. Ord. Marked Bars....	....			@	7	12 8
" Common "	....			@	5	0 0
" Bl'k Sheet, singles	....			@	6	15 0
Welsh Bars (f.o.b. Wales)...	4	12	6	@	4	15 0

Tin.—The market irregular, but showing strong undertone. Straits quoted at $\$97.17\frac{1}{8}$ @ $\$98$, spot, and $\$98.10$ / for three months' futures.

Copper.—Prompt Chili Bars strong; futures firm. Trading brisk. Chili Bars, $\$95$ @ $\$95.5\frac{1}{2}$, spot, and $\$79.5\frac{1}{2}$ three months' futures. Best Selected, $\$79$ @ $\$80$.

Lead.—There is a fairly good business. Prices very firm. Soft Spanish, $\$13.10$ / @ $\$13.15\frac{1}{2}$.

Spelter.—Demand has continued good and the market strong. Silesian, ordinary, $\$17.15\frac{1}{2}$ @ $\$18$.

Old Metals, Rags, &c.

The purchasing prices offered by dealers are as follows:

Heavy Copper	...	...	...	@	10	...	@	12
Light Copper	...	...	...	@	...	...	@	...
Copper Bottoms	...	...	...	@	...	...	@	...
Brass, Heavy	...	...	...	@	...	...	@	...
Brass, Light	...	...	...	@	...	...	@	...
Composition	...	...	...	@	...	...	@	...
Lead, Heavy	...	...	...	@	...	...	@	...
Tea Lead	...	...	...	@	...	...	@	...
Zinc	...	...	...	@	...	...	@	...
Wrought Iron	...	...	...	@	16.00	...	@	...
Light Iron	...	...	...	@	7.50	...	@	...
Stove Plate Iron	...	...	...	@	8.50	...	@	...
Machinery Iron	...	...	...	@	12.00	...	@	...
Grate Bars	...	...	...	@	...	...	@	5.00
Old Rubber Springs	...	...	...	@	...	...	@	...
Old Rubber Shoes	...	...	...	@	...	...	@	...
White No. 1	...	...	...	@	...	...	@	...
White No. 2	...	...	...	@	...	...	@	...
Canvas, Linen, No. 1	...	...	...	@	...	...	@	...
Canvas, Cotton, No. 1	...	...	...	@	...	...	@	...
Canvas, No. 2	...	...	...	@	...	...	@	...
Seconds	...	...	...	@	...	...	@	...
Soft Woolens	...	...	...	@	...	...	@	...
Mixed Rags	...	...	...	@	...	...	@	...
Gunny Bagging, No. 1	...	...	...	@	...	...	@	...
Jute Butts	...	...	...	@	...	...	@	...
Book Stock	...	...	...	@	...	...	@	...
Newspapers	...	...	...	@	...	...	@	...
Waste Paper	...	...	...	@	...	...	@	...
Hemp Twine	...	...	...	@	...	...	@	...
Sisal Baling Rope	...	...	...	@	...	...	@	...

The new passenger station of the Central Railroad of New Jersey, in Jersey City, will be an imposing structure of brick, three stories in height, with a central tower 140 feet above the ground, and the frontage will be 217 feet. The main waiting room will be floored with bluestone flagging, and the sides will be formed of glazed brick imported from Germany. The structure will be made as nearly fire-proof as possible, the partition walls being of fire-proof material, while the floor beams and roof will be of iron. The train shed, 510 feet in length, will be roofed with iron, supported on iron beams and girders. The total cost of this improvement is estimated at $\$300,000$.

Hardware.

A good feeling prevails in the market, and manufacturers and merchants speak hopefully of the outlook for the season's trade. Buyers are placing orders more freely and the aggregate of the business is good. The general steadiness in prices and the improved condition in certain lines, together with the excellent prospects for business at large, are features to be noted as rendering the situation satisfactory.

Barb Wire.

The Eastern market is without special features, the demand being quite limited. Prices are nominally unchanged, the indications being, however, that lower quotations than have prevailed during the past season will rule during the coming season.

Cut Nails.

There is a slightly improved feeling in the New York Cut Nail market, due to a fair run of orders, and due to the greater confidence which buyers show. The setback experienced in the spring in building delayed considerable work, which has again been taken up, and distributors of Nails find that the consumption is a little heavier than expected. They see no danger in buying for the next 30 or 60 days, while there is always the possibility of an advance. Although Steel Nail Slabs have risen materially in the West, they have not as yet gone higher in Eastern and Central Pennsylvania, though large contracts have been placed lately. The rise in Old Rails has but little influence on the Nail trade, because they are used to a far less extent than they were formerly. Prices of Nails in the New York market remain the same, \$1.85 @ \$1.90 for carload lots on dock, and \$1.90 @ \$1.95 for small lots from store.

At the meeting of the Western manufacturers, held at Pittsburgh last week, 19 out of 34 mills were represented. A resolution was unanimously passed in favor of joining a pool, provided the assent of the absent manufacturers could be obtained. The position in the West differs from that in the East in that there has been a marked advance there in Steel Nail Slabs.

The Western manufacturers of Cut Nails express themselves very confidently in regard to sustaining the advance in price which they have recently made. It is further intimated that as soon as the advance is realized by the trade to rest on a firm basis, another step upward will be taken. Usually heavy contracts have been entered at very low prices before an advance is made by the manufacturers, but they assert that this fall they have not committed that mistake. The benefit accruing from higher prices will thus be reaped by themselves and not by the merchants. It remains to be seen whether the manufacturers really have thoroughly learned this lesson. If they have done so, they will have accomplished a great deal toward again making the manufacture of Cut Nails a reasonably profitable branch of the Iron and Steel trades. They will still have the competition of the Wire Nail to contend with, but there is a wide field for both to work in.

Wire Nails.

The improved condition of Wire Nails, especially in the West, is to be noted, and the maintenance by the manufacturers of the recently advanced quotations, \$2.55 for carload lots, and \$2.65 for smaller lots. The Eastern market feels the effect of this improvement, but no announcement of a corresponding change has been made.

Miscellaneous Prices.

Lee-Clarke-Andreesen Hardware Company, successors to Lee, Fried & Co.,

Omaha, Neb., have issued their Gun catalogue No. 1, which is an elegantly printed large-paged pamphlet of 32 pages. It is accompanied by the discount sheet given below, which, besides giving prices on the goods, will be of interest as showing definitely the lines of Fire Arms and Implements offered by the company:

	Per cent.
Breech-Loading Double Guns.....	33½
Pieper's Breech-Loading Double Guns.....	40&10
Colt's Breech-Loading Hammer Guns.....	25&10
Colt's Breech-Loading Hammerless Gun.....	25
Winchester Repeating Shot Gun.....	25&10
Hopkins & Allen Single Shot Gun.....	33½
Flobert Rifles, XL Breech-Loading Gun, &c.....	33½
Winchester Rifles.....	25&10
Colt's Rifles.....	25
Marlin Rifles.....	25&10
Colt's Revolvers.....	25
Revolvers.....	25
Revolvers.....	50
Gun Implements.....	50&10
Gun Implements (except Ideal Tools).....	50&10
Ideal Tools.....	25
Reloading Tools.....	25
Cartridges.....	25
Brass and Paper Shells, and Loaded Shells.....	Prices quoted upon application
Shot, Powder, Dunscomb's Shot Case, \$4.25 net.....	
Primers and Percussion Caps.....	
Gun Material (except Wad Cutters).....	50
Wad Cutters.....	30
Powder Flasks and Shot Pouches.....	33½
Cork Screws.....	30
Pocket Cork Screws and Key Rings.....	30
Dog Collars.....	33½

Attention is also called to the lines of goods for which the company are manufacturers' agents, and the last page of the catalogue is devoted to their Cutlery department.

The Burnside Mfg. Company, Burnside, Ky., for whom Wm. H. Jacobus, 90 Chambers street, New York, is agent, issue a circular representing a new cedar Faucet which they are now manufacturing. They call attention to the improvement in the finish, it being explained that every trace of the saw and lathe marks is removed, while an improved polishing machine gives a hard, smooth surface, which makes the Faucets attractive in appearance. An oblong hole is made in the side of the key, which is referred to as affording a freer flow and rendering the key absolutely interchangeable. This is an advantage which will be appreciated when Faucets are to be packed with other goods, as the keys can be taken out, thereby reducing materially the space occupied. The circular also alludes to other advantages possessed by the company's Faucets, mentioning the desirability of red cedar for Faucet use, the fact that there is no lining of cork or leather to become loose and that there is no metal to corrode. The Faucets are sold from the following price list, which is subject to a discount of 50 per cent.:

6	7	8	9	10 inch.
\$10.80	11.52	12.24	15.12	18.72 per gross.

The Faucets are packed in barrels which contain about the following number of Faucets: 6 inches, 35 dozen; 7 inches, 30 dozen; 8 inches, 24 dozen; 9 inches, 20 dozen; 10 inches, 15 dozen.

It is intimated that the American Needle and Fish Hook Company, New Haven, Conn., for whom the Alford & Berkele Company, 77 Chambers street, New York, are agents, are about to enter upon a new departure looking to a more general marketing of their goods, instead of permitting the European manufacturers to sell their goods in this country to the extent to which this has been heretofore done. Thomas Wallace, of the well-known firm of Wallace & Sons, Brass manufacturers, has been elected to the presidency of the company and Mr. Hull has been chosen superintendent. In the revised price list the Ringed and Flatted Kirby and Limerick Hooks are put upon the same list. The discount on these Hooks is 50 and 10 per cent.; on the New York Trout or

Carlisle Hooks the discount is 60 per cent. and on the remainder of the list 50 per cent.

The Claffen Mfg. Company, Cleveland, Ohio, quote their Security Sash Locks and Security Door and Window Bolts at discount 70 per cent.

An advance in the prices of Shot took place August 30. The following are the present prices, subject to a discount of 2 cents per bag, 25 pounds, if paid within 5 days from receipt of bill:

Drop Shot, per 25-pound bag.....	\$1.40
Drop Shot, per 5-pound bag.....	.38
Buck and Chilled, per 25-pound bag.....	1.65
Buck and Chilled, per 5-pound bag.....	.38

An advance has also been made in the price of Sheet Lead, Lead Pipe, &c., the present prices of which are as follows:

Lead Pipe, per pound.....	\$0.07¼
Sheet Lead, per pound.....	.08
Block Tin Pipe, per pound.....	.45

It is gratifying to note the satisfactory condition of the Auger and Bit market. Prices are maintained with steadiness and regularity and this line of goods is thus in a condition more satisfactory than it has been for some time. A conservative policy, which may perhaps be regarded as the natural reaction from the animated competition which has frequently prevailed in this line, is the cause of the improved condition rather than any artificial or formal strengthening of the market in the way of combination between the manufacturers.

Stove Hollow-ware continues without material change, this line being characterized by steadiness in price and a maintenance of the advances which have from time to time occurred. In the present condition of things it is anticipated that there will be before long a further moderate advance. Enamelled and Tinned Hollow-Ware remain without change.

The prices of Agricultural Wrenches are well maintained by the manufacturers and the condition of the market in this line is regarded as satisfactory. Only a slight irregularity is caused by the stocks held by many of the jobbing houses and purchased by them at the considerably lower prices which recently prevailed. The influence of these goods is not sufficient to seriously interfere with the maintenance of prices by the manufacturers, and it is expected that the supply now offered at irregular figures will soon be exhausted.

The disturbances in the Agate and Graniteware trade at Chicago and St. Louis have at length been happily ended and the manufacturers and jobbers are again pursuing the even tenor of their way. The unsettled condition of this trade can be traced back to about a year since. At that time a prominent Western jobber began to give an extra discount to his customers, notwithstanding an agreement made between the manufacturers and all jobbers that these goods should be sold at a price not below a fixed rate. Probably the house referred to was not the only erring member of the family, but as the practice became known to other jobbers they appealed to the manufacturers to be released from their agreement, so that they might establish any price found necessary to meet competition. About the 1st of June the manufacturers acceded to their request and gave the jobbers the liberty they asked for. A very short time sufficed to show the undesirability of such an arrangement, and the manufacturers then attempted to rebuild the fabric which had been destroyed. Opportunity was thus given to jobbers desiring a change in the former agreement to insist upon the adoption of their views as a condition of their signing. A stand was also taken against recognizing as jobbers in these goods those who had been prominent in cutting prices, in violation of the agreement. For a time a rupt-

ure in the friendly relations of prominent jobbing houses seemed impending as an outgrowth of the attempt to settle this one question. Conditional agreements were at length signed by some of the jobbers who were most conciliatory in their temperament and earnestly desired to re-establish peace, and, with these signatures for a beginning, the manufacturers continued their efforts with ardor until all had signed. The *statu quo ante bellum* has now been regained, manufacturers and jobbers occupying their former relations and prices being restored to their old figure.

Obituary.

Amos Call, president of the Bemis & Call Hardware and Tool Company, Springfield, Mass., died at his home in that city on Thursday last. He was stricken with paralysis on Sunday and was unconscious the greater part of the time until his death. Mr. Call was a native of the city in which he died, having been born in 1814. In 1828 he was apprenticed to Stephen C. Bemis to learn machinists' trade, Mr. Bemis being engaged in Willimansett at that time, where, as well as at Hartford and Meriden, Conn., Mr. Call's early life was spent. In 1844 he returned to Springfield, and, in connection with Mr. Bemis, the business was established with which he was connected at the time of his death. The manufacture of tools which was begun at Willimansett thus became an important industry, and Mr. Call was active in its development. The first manufacturing was done in what is now Alden's Building, on Mill River, but in 1864 the company moved to the American Machine Works, on Liberty street. Five years later they returned to Mill River, having bought the property in which they have been located ever since. During the war the company did a large business in the manufacture of harness irons. They suffered from a disastrous fire in 1872, but the business has been prosperous since. Mr. Call took an active interest in the affairs of the city, in which he has held different offices. He was a prominent member of the First Baptist Church and was also a leading Mason. He celebrated his golden wedding May 16 of the present year. His personal qualities are thus referred to in an article relating to his death in the *Springfield Union*:

One of Mr. Call's leading characteristics was his thoroughness, and whatever he undertook received close and conscientious attention. He was devoted to his business, but did not neglect any of the other relations and duties of life. No sacrifice was considered by him too great to make for his family and friends, and his home life was delightful. He was a kind and considerate neighbor, and those who knew him most intimately feel that they have lost a friend on whom every dependence could be placed. He was held in high regard by rich and poor alike, and in his death the community loses one of its best citizens.

Trade.

Our reports from Louisville, Ky., under date September 3, are to the following effect:

The Hardware trade of Louisville, Ky., is feeling the general impulse of advance that comes over the country, and which is appreciated by a commercial center possessing great advantages and being awake to its possibilities. True, the Cut Nail and Wire Nail manufacturers stole a march on the trade here, having met and advanced prices before the dealers, with few exceptions, were aware of it. This action, though much desired and expected, was unlooked for so suddenly, but enough Nails were secured for legitimate pur-

poses. Probably 15,000 kegs of Cut Nails were placed here, which amount is not too large for this market. Wire Nails came in for a good share of patronage and have secured a very desirable custom. The Nail mills say their action in advancing 15 cents per keg was forced by Steel going up \$2 per ton, all of which is legitimate and ought to hold.

Bar Iron has also advanced \$1 per ton and will probably soon take another step forward, caused by the upward movement of Old Rails. The demand from store for Bar Iron has improved and cut prices are withdrawn by the dealers.

Carriage and Wagon Goods continue in active demand and those dealers making a specialty of heavy goods report a very satisfactory trade for the past month.

Wire of all kinds remains too low, in comparison to other goods, but shipments from store are large in volume, although at small profits to the dealers.

The city is entering on a month of commercial celebration and is putting on holiday attire. On certain days during the next four weeks the city will be given up to magnificent pageants, which is a new venture for Louisville, but as all the merchants and manufacturers have gone into the spirit of the enterprise, it is bound to be a success.

All of the business streets are profusely decorated and illuminated at night, and grand results are anticipated from the varied attractions offered visitors.

The following review of the Hardware trade of New Orleans, for the year ending September 1, is given by the *Times-Democrat* of that city:

The volume of business for the year ending June 30, 1888, was quite satisfactory to the New Orleans jobbers. In our report of September 1, 1887, we called attention to the fact that the volume of business for the year ending June 30, 1887, was 25 per cent. greater than the previous year. It is an encouraging feature in this branch of business to see that this increase continues. A careful estimate, based chiefly on actual figures, shows the increase in the amount of goods handled by the trade for the year ending June 30, 1888, to be over 30 per cent. greater than that of 1887. It should be borne in mind that this large increase was made in the face of a brisk competition from the North and West, where a partial failure of the crops paralyzed business and caused those sections to look to a more distant and favored field in the South to unload their surplus stocks, bought in anticipation of their usual home demand. That our Hardware merchants were able not only to hold their own, but to increase their trade under such circumstances is an evidence of their ability to compete with any market. The small profit resulting from a surplus of goods on the market was felt, but the increase of sales compensated for this loss. During the year there has been a gradual decline in values, notably in Iron, Nails, Iron Pipe, Barbed Wire and several articles of Hardware not sustained by combinations and in which the cost of production is not chiefly due to labor. The outlook for the future is encouraging; crops throughout all sections of the South, with few exceptions, are good and a fine harvest may be expected.

The *San Francisco Journal of Commerce*, in a recent issue, gives the following review of the trade in Hardware and Metals for the past half year:

There were no very great changes as to prices in Hardware and Agricultural Implements during the half year. There was, however, a very good business done, and a considerable increase shown over that of last year on account of the vast increasing population of the State and the many new homes being built in every quarter. The quantity of Scrap Iron imported has been almost 7000 tons in excess of that for the same time in 1887. All this goes to the rolling mills for the production of Bar Iron, &c., showing a very great increase in home production. In the spring heavy sales of Pig Iron were made for the South. In the Nail trade imports have been light, while home production has been very large. The market opened in January with \$2.75 as the basis price for carload lots, and \$2.90 for less quantities. On March 1 carload lots were advanced to \$2.90 and smaller quantities to \$3. In April carload lots were advanced to \$3, smaller quantities to \$3.10. This was the highest, as on June 5 there was a reduction to \$2.90 for carload lots and \$3 for smaller quantities. There was considerable fluctuation in the price of Pig Tin. It opened at 35 cents to 37½ cents in January. In February the market advanced to 40 cents, but dropped to 38 cents at the close. In March it dropped to 36 cents. It remained at 36 cents to 37 cents through March and April. In May a panic took place in the market, and prices dropped to 30 cents and 33 cents, and then to 22½ cents and 25 cents, at which it

remained in June. The imports of Tin Plate have been the largest in the history of the market. The latter has fluctuated considerably. It opened at \$5 for Coke. In February an advance to \$6 was made. In May there was a drop in price to \$5.50 for Coke. In June there was a further drop to \$5.25.

Robert H. Seymour, treasurer of the Henry Seymour Cutlery Company, Holyoke, Mass., in a recent interview refers to the fact that they export their Scissors and Shears largely to England, Australia, South America and Mexico. They are able to do this, competing successfully with the English manufacturers in their own market because of the special processes employed by them which the English manufacturers have not yet been able to imitate. They also supply the Canadian trade to a considerable extent, although there is a duty of 30 per cent. upon their goods imported into that country.

Items.

Morley Bros., East Saginaw, Mich., advise us that in printing the price lists to which we referred in a former issue they unwittingly used matter which had been copyrighted by T. W. Root, and as soon as this fact was called to their attention they discontinued the distribution of the lists. They allude to Mr. Root's price lists as the best thing of the kind they have seen, and take pleasure in referring the trade to Mr. Root.

A Hardware house, who may be addressed as "Hardware," Box 1385, Post Office, New York, advertise among the Special Notices, on page 56, for an experienced Hardware salesman well acquainted with the Western and Middle New York State Hardware retailers. The opening is deserving the attention of those desiring such a position.

The American Bit Brace Company, Buffalo, N. Y., for whom Sise, Gibson & Co., 100 Chambers street, New York, are agents, in their announcement on page 58 allude to the accumulation of orders, especially for their Pederson Ratchet Brace, causing their patrons inconvenience by delay in receiving the goods. They have, however, purchased new machines, thus increasing their capacity and putting them in position to take care of orders more promptly.

As appears by the announcement on page 55, there will be, September 14, an auction sale of the machinery of E. Remington & Sons, Ilion, N. Y. Some farming implements and other articles are also advertised.

The Biddle Hardware Company, Philadelphia, Pa., have issued a circular for the fall trade, in which seasonable goods especially are illustrated. The exhibit of Lamps, with which the pamphlet opens, is especially fine and satisfactory. It is to be observed that the catalogue gives the prices of the Lamps complete with the shades and the various fixtures, a feature which will be appreciated by the trade. The other goods represented in it are also of interest. A discount sheet will be mailed to merchants applying for it.

Announcement is made that the copartnership heretofore existing between Chas. L. Knapp, William H. Knapp and Clinton I. Hague, who have been doing business in this city under the firm name of Knapp & Hague, and in New Haven, Conn., under the firm name of Union Form Company, has been dissolved. Chas. L. Knapp and William H. Knapp also announce that they have purchased the interest of Clinton I. Hague and will continue the business at 52 Fulton street, New York, and New Haven, Conn., under the name of Knapp Brothers.

The W. F. & John Barnes Company, Rockford, Ill., have issued a new catalogue of their Foot, Hand and Steam

Power Machinery in the form of a well printed and fully illustrated pamphlet of 64 pages, a considerable enlargement on their former issues. The well-known line of machines described in it, with others which have recently been added, will be regarded by the trade with interest.

The Moore & Barnes Mfg. Company, 103 Chambers street, New York, issue circulars relating to some of their recent additions to their line. One of these calls attention to an assortment of spooled wire, which is put up in a painted wooden box with a hinged cover. This assortment contains 140 spools of Black and Tinned Annealed Steel, Copper and Brass Wire, and comprises sizes likely to be called for. The assortment is described in the circular with the retail prices, showing that the dealer can realize \$10 on the assortment, the price at which it is sold giving a good margin of profit. Another circular relates to the Phoenix Bench Anvils for amateurs, jewelers and light bench use. Three sizes are made, weighing respectively 1½, 3½ and 7½ pounds. The Phoenix Window Cleaners and Floor Scrubbers are also alluded to, illustrations being given of them. A third circular relates to the Phoenix Vegetable and Potato Slicers, Dunlap Pattern, and the Phoenix Carpet Stretcher. The advantageous terms on which these goods are offered are referred to by the company.

Paine, Diehl & Co., Philadelphia, issue a 14-page folded leaflet, which is designated "A Few Decidedly Good Things." In it their leading household specialties are illustrated.

The Bridgeport Chain Company, Bridgeport, Conn., call attention to a new Chain for hanging pictures, which they designate as the Triumph Wire Chain. It is referred to as very strong and the point is made that pictures hung with this Chain are not so liable to shift their position as when hung with Cord, Wire, &c. It is sold upon Spools holding 15 yards, the Chain being of different sizes and offered in finish of different kinds.

S. A. Haines, 90 Chambers street, New York, selling agent for the Little Cyclone Churn, is sending out circulars in regard to it and the favor with which it is regarded by the trade. It is intimated that while it has been on the market for nearly two years no special effort has been made to sell it, but that now its sale is to be pushed, and with a view to getting it into the market as rapidly as possible an important reduction has been made in its price. Circulars relating to it are furnished those who desire to take hold of it.

The Peters Cartridge Company, Cincinnati, Ohio, are attracting attention elsewhere in this issue to an improvement in their Loaded Cartridges. In place of one Wad to perform the duty of retaining the charge after loading two are inserted, thereby assisting to confine the gases caused by the combustion of the powder and developing the full force of the charge. These Wads are lubricated by the company's special formula, and it is claimed that the Gun is thereby kept cleaner than by the use of their previous Wad.

The following announcement of a change in the firm of Dunlavy & Roe, Abilene, Kan., which is made in a local journal, indicates the esteem in which the members of the firm and those connected with it are regarded in their community:

The well-known and extensive Hardware firm of Dunlavy & Roe yesterday dissolved partnership, Mr. Roe retiring from the business and Mr. Dunlavy continuing under the name of John Dunlavy & Co. During the time he has been engaged in business in Abilene, Mr. Roe has made many friends, who will be sorry to hear of his retiring from the business, but who will unite in wishing him success in any new venture he may determine to make. The head of the firm as it now remains is John Dunlavy, a man of eminent business qualifications, who

has been successful in every business undertaking. Mr. Dunlavy has associated with him as general manager and salesman one who is well and favorably known to every citizen of Dickinson County, the veteran Hardware merchant, W. H. H. Bonebrake. Mr. Bonebrake came to Abilene in 1871, and has ever since been identified with the business interests of our city. He will do his part of the work with his old-time geniality, and win many customers to the establishment. Carl Potter, the man of small stature but giant mind, it goes without saying, will be retained to manage the books of the firm. Because of the thorough business qualifications and genial dispositions of the men who constitute the firm of John Dunlavy & Co., we predict for it a future of unexampled prosperity.

Frasse & Co., 92 Park Row, New York, issue a circular calling attention to the U. S. Hack Saw Blades, to the quality and merits of which they allude. The advantages claimed for the Blades are explained.

The Chicago Spring Butt Company, Lake and Union streets, Chicago, have recently made a successful attempt to open up an export trade in their specialties. On the 9th of June they sent a representative to the leading cities of Great Britain and Ireland, who returned to Chicago on the 10th of August with a record of sales made covering 25 tons of Spring Hinges. The points in which he sold goods comprise Cork, Dublin, Belfast, Glasgow, Edinburgh, Liverpool, Leeds and Sheffield. He further made arrangements with Moser & Sons, of London, and Hammacher & Delnies, of Hamburg, to act as distributing and sales agents for the company. They will carry a full line of the company's Spring Butts, which they buy, and will thus sell from stock.

The Competition in Ciphers.

The offer made in our issue August 23, of a prize for the largest list of ciphers for marking goods, on the terms and conditions named, has been received by the trade with much interest. It is evident that the competition will be animated and attended with some interesting developments. Among the replies to the problem given in that issue as to the druggist's cipher, we have the following which describes the manner in which our correspondent approached it:

I started very grandly, thinking it would be a simple matter to solve the enigma algebraically. Although the operation was not very successful, it may be of interest to outline it, in the hope that it will suggest to some others a rule that may be applicable to all such cases. As an illustration take the first item (nail brushes), and we have $12e$ equal rpl ; but of course the letters rpl do not mean that their numerical equivalents multiplied together are equal to $12e$. Expressed algebraically the equation would be as follows: $12e = 100r + 10p + l$. As the letters represent units, tens, and hundreds, in the same way the second equation would be: $12a = 10b + o$. It is needless to go through the full list, as I think this will explain the method I intended to follow. If the druggist had given four more items it would have been easy work to reach the answer, for in that case we would have had 10 equations of 10 unknown quantities, and it would have been only a matter of a little patience to solve for each letter. In the case presented there are 10 unknown quantities, but only 6 equations, and while it might be possible to solve even under these conditions by making use of the substitution and comparison methods, I for my part did not have energy enough to pursue the inquiry far enough to determine. The solution I finally reached was more the result of guesswork than anything else. As each single letter must necessarily be less than 10, 9 will be the only one which when multiplied by 12 will give a product of three

places. It is evident, therefore, that e represents the figure 9 and $rpl = 108$. Another help will be gained from the birdseed and the soap items. In the former case $12f = 10j + a$, or $f = \frac{1}{12}a$, and similarly in the case of soap $i = \frac{1}{12}l$. Both f and i , therefore, must be some number under 5, because, as those equations show, they are half of single units. One or naught they cannot be, because those were already used; therefore they must be either 2, 3 or 4. With this much data, the solution of the remainder was comparatively easy. It is obvious that the word is profitable.

Having relieved my mind of this problem, it occurs to me that possibly you might wish to print one which I have gotten up, and which I believe will not be so easily soluble. Realizing that if 12 times a single number gives a product of three places, the number must be 9, I have carefully refrained from giving any such assistance in the problem below. This problem we will suppose was a'so the work of a druggist, and it so happened that he took the same items, but, being a rather eccentric genius, he priced his goods by the one-half dozen instead of the dozen. I cannot vouch, furthermore, for the approximate correctness of his figures, for, having the answer at hand, it appears to me that his prices are hardly in accord with current market quotations. However, any more preface is unnecessary, so here is the statement in tabular form:

	Each.	Per half dozen.
Nail brushes.....	r	lt
Tooth brushes.....	w	am
Bird seed, packages.....	a	ek
Soap, cakes.....	s	wl
Cologne, bottles.....	ol	akl
Manicure cases.....	tae	eako

Trade Topics.

A Kansas Hardwareman, writing in regard to the case and cartage question says:

On this question of case and cartage there is no question but that the retail trade would be glad to have these charges abolished. While they would still indirectly pay about the same as they do at present they would know more accurately what their goods cost them. It is notorious that manufacturers in some lines charge twice as much for cases and drayage as is variable as case charges. To most dealers outside of the larger jobbing points the case is net loss. These charges for case and cartage are something we never grumble over, but if some houses that we deal with charge us two prices on them we squeeze out a little lower figure from them than from others or let them go. We know of a party who was charged 75 cents or \$1 for a couple of soap boxes ten years ago, and he has never bought a cent's worth of the house since, they refusing to make any rebate when their attention was called to the matter. While we would be very glad to see these charges done away with, we are not very sanguine of this result, as we believe it is a source of revenue for many manufacturers and all jobbers, and we do not think that complaints from their customers are frequent enough to make them consider a change desirable.

From a Michigan Hardwareman we have the following relating to the same question. On his letter-head the following form of order is printed:

Gents: Please ship via R. R. (F. O. B.) Send R. R. contract and draw at sight, 30 days from date of bill, through Home National Bank, without exchange or protest. Cancel all orders for goods not sent with first shipment.

Concerning which our correspondent adds:

I have used the above order for the last 23 years and have no trouble with boxes, cartage, &c. If Iowa Hardware firm adopt the same form they will have but little to charge back.

Concerning the recent course of the market in Wire Nails a correspondent writes as follows:

In conversation with the different manufacturers I hear how certain firms are ruining trade by cutting prices so low that no one can do business, except at a loss, and that many are thus doing business is not to be doubted, but any one who has given the matter any thought can readily see that the present depression is solely the result of natural consequences. We are selling Wire Nails in direct competition

It contains 24 drawers, 9 x 14 inches, running through and divided in the center. They can be drawn out from either side. The front half of drawers is filled with Curry Combs and Brushes, Seine Twine, Trout Lines and Sash Cord, and the rear with surplus stock of Pocket Cutlery, Shears, Stove Blacking, &c. On the

bins holding about 100 pounds each. On this counter is a Westphal Bolt Case. The Stove platform shown in the diagram, Fig. 262, is 24 feet long, 3½ feet wide and 6 inches high and is occupied by Ranges. The Cook and Heating Stoves occupy the remainder of the floor space, as indicated. The office is 7 x 12 feet and is located

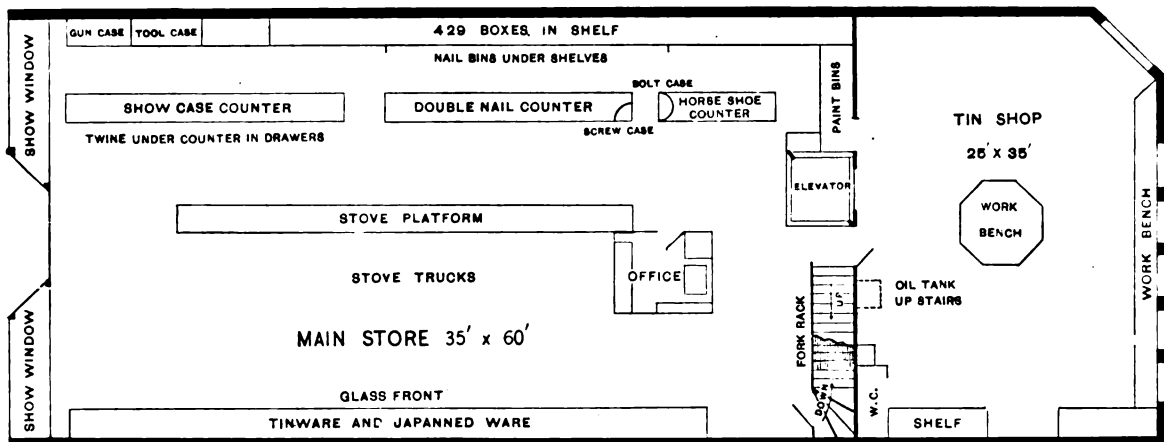


Fig. 262.—Store of E. R. Strong, Fort Atkinson, Wis.

with Cut Nails, and on their comparative values must depend the price. As long as the statements so extensively made by Wire Nail manufacturers that Wire Nails contained 50 per cent. more to the pound, and held more than Cut Nails, were not doubted, they readily commanded a corresponding advance in price. But now that Cut Nail manufacturers have proved and extensively advertised the fact that as regards holding qualities the very reverse is true, and that Wire Nails count out less Nails to the pound than advertised, it is certainly very natural that the price should be affected. We believe that Wire Nails can be so improved as to hold more than Cut Nails, but, unless this is done, and done universally, there is more chance of a further decline than an advance in price, which all are anxiously awaiting.

The following inquiry from a Pennsylvania Hardware house explains itself:

What is the reason some of the surplus capital of America is not invested in a solid wrought-steel face or solid steel Anvil factory? You certainly know that there is not a first-class Anvil of European manufacture on the market. The Wright and the Wilkinson Anvils all cushion on the face, crumble on the edges, or the steel plating parts from the body of the Anvil. It is foolish for American manufacturers to persist in ignoring these facts. We want a first-class article made at home, and made at once, and no article of like importance offers such certain and large profit for the same investment. The writer has had 15 years' experience in selling Anvils to the blacksmiths of Western Pennsylvania and Eastern Ohio, and makes no wild statement in saying that he could sell a properly made domestic article to every blacksmith in the United States needing such a tool as against anything imported from Europe. Give this some attention, as our neglect in this matter is unbecoming an inventive, progressive and wealthy people.

Arrangement of Stores.

We give below a diagram of the store of E. R. Strong, Fort Atkinson, Wis., and also a description of some of the special features of his arrangement. It will be observed that the tin shop is in the rear of the store, and that some attention is paid to its fittings. Regarding his store, Fig. 262, which was erected in 1887, and is exceptionally complete in its arrangement, Mr. Strong writes:

My store has a frontage of 35 feet, with an 8-foot entrance. The depth of the building is 85 feet, 25 feet being cut off the rear end for shop. My first counter is 2 feet 4 inches in height and 15 feet long.

south wall or Hardware side the shelving is 18 inches in depth and 8 feet high, surmounted by a small cornice. Above this are two shelves 1 foot in width, on which are kept full packages and surplus stock of shelf goods. Goods on the upper shelving are reached by means of a railroad ladder running the full length of the shelving, 53 feet. The first 12 feet are divided into

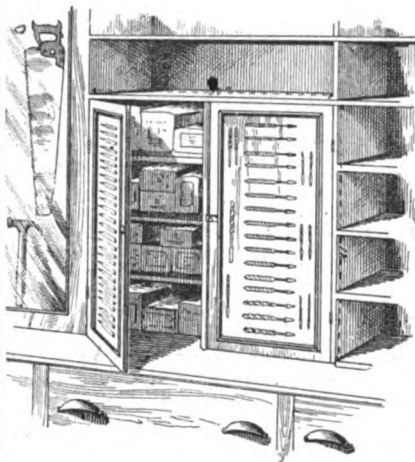


Fig. 263.—File and Bit Case.

two cases with sliding glass doors, the first for the display of Guns and the second for Carpenters' Tools. Next to the Tool case is a File and Bit case, 28 x 30 inches, with swing doors, in which are kept Files and Bits in original packages, samples being displayed on the doors, as shown in Fig. 263. Beyond this there are five sections of drawers, each 10 x 6 inches, and three sections, each drawer 8 x 6 inches, and a single row running the full length of the shelving, 15 x 7 inches. Each drawer occupies a pigeon-hole by itself, and has a flanged face to prevent its being pushed in too far. Across the shop wall and elevator side are arranged shelves for Glass and fine Carriage Paints and Varnish.

On the first counter is a high showcase for Pocket and Table Cutlery and Shears and a small counter desk, in which is kept the money drawer and cash sales book. Next comes a double Nail counter, Fig. 264, with showcase for display of Paint Brushes and miscellaneous articles. On the rear end of the Nail counter is a Westphal Screw Case. The third counter is used for Horseshoes and is divided into

12 feet forward of shop, commanding a view of the shop, as well as of the salesroom. The office is not raised from the floor, but is ceiled up to the height of 3 feet 9 inches, and above this is a wire railing 2 inches wide running around the office. The door is of wire and reaches from the floor to the top of the railing. Against the stairway wall I have 19 of J. N. Hager's Patent Fork and Shovel Brackets, of which you have already given a description. This device for keeping Steel Goods I consider one of the most valuable features of my store. The goods are always well displayed and are never in the way.

My elevator is a No. 5 Reedy Double-Drum Elevator; platform 5 x 6 feet. The guide posts and weight are on the side, and the hoisting rope in front and brake ropes in one corner, thereby giving access to the elevator either from the shop or salesroom. The elevator runs from the cellar to the second story.

Our Rope Reels are in the second story. The ends of the Rope are passed through holes in a board nailed to the side of the elevator to prevent them from unreeling too fast, and the ends are brought down within easy reach from the elevator platform on the level of main floor. The

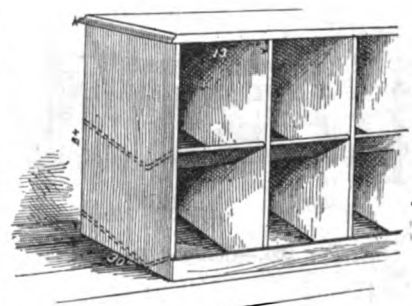


Fig. 264.—Nail Counter.

second story is used principally for storing surplus stock of Stoves, Tinware, Sheet Iron and heavy Tin Plate. In the cellar are kept nails, Barb Wire, Door Hangers, &c.

The shop is entered between the elevator and the stairway door. To the right of the door two 1½-inch gas-pipes lead down from two two-barrel tanks in the second story containing raw and boiled Oil. In the corner of the shop is a self-acting water-closet. Fig. 265 represents

cupboard for keeping Boiler and Tin Plates and Tinners' Trimmings. In the lower right-hand compartment are kept IC and IX 20 x 28 bright Tin Plate and IC and IX 20 x 28 R. T., and the smaller sizes of Tin Plate. In the double cupboard to the left Nos. 8 and 9 Tin and Copper Boiler Plates are kept, each kind having a shelf of its own. Above the Boiler Plates are kept Copper Pits of all kinds. The upper cupboard is mainly occupied by Tinners' Trimmings. By this arrangement the stock is kept in good

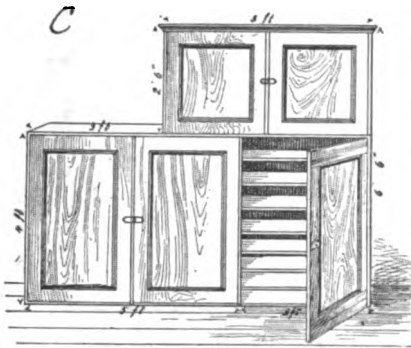


Fig. 265.—Cupboard for Tin Plates, &c.

shape. Fig. 266 shows our octagon tool bench in the center of the shop, which fully explains itself. It is 7 feet across, 33 inches high, and has shelf underneath for smaller tools. The eight sides of the bench are occupied by Tin Folder, Vise and Bench Drill, Small Groover, Roller, Double-Seamer, Stove-Pipe Swedge, Stove-Pipe Folder and Groover.

From B. H. Newell & Co., Shelburne Falls, Mass., we have a description of their Belting rack, which is shown in the accompanying illustration, Fig. 267, in connection with accommodations for other goods, as referred to below. After stating that their object in constructing this rack for Belting was to obviate the necessity of removing the roll from its compartment and requiring one clerk to hold it while another unrolled the requisite quantity of Belting, our correspondents in describing their method say:

Our rack is made of standards 3 feet square and 1 inch thick with a semi-circular piece cut from their front side extending to the center. These standards are set upon a base 3 inches high to keep

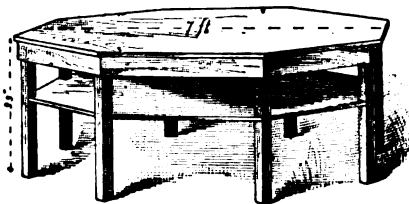


Fig. 266.—Octagon Bench.

out dust, &c., and are placed $\frac{1}{4}$ inch further apart than the width of Belt the compartment thus formed is intended to hold. To prevent warping and to assist in nailing the standards in place we had a piece of $\frac{1}{4}$ -inch board placed in the bottom and top of each compartment between the standards. In the center of the standards we attached by three screws a hook made from 1 x $\frac{3}{4}$ inch iron, bent as shown in the illustration, the hook being designed to hold a $\frac{1}{4}$ -inch bar. These hooks must be set into the face of the standard just far enough to bring the bar to the center of the compartment. We then took a piece of timber 3 $\frac{1}{4}$ inches square and cut off blocks $\frac{1}{4}$ inch shorter than the sev-

eral compartments were wide, bored a $\frac{1}{4}$ -inch hole lengthwise through the center and drove a piece of $\frac{1}{4}$ -inch machinery steel cut to the proper length (which is 1 inch longer than the blocks), allowing the steel to project through them $\frac{1}{4}$ inch from each end. The edges of the block must be beveled a trifle to prevent injury to the inner turn of the roll of belting. The blocks are then driven into the orifice in the center of the roll and the belt hung upon the hooks above described. The roll is now hung upon its center like a grindstone, can be easily drawn out and as easily rolled up again, without taking it from its place. Our store is 65 feet in length, and the rack, being placed in the rear, gives ample space for unrolling and measuring the belt. Marks along our counter enable us to draw out about the required length; but for measuring we have found no better way than to use a reliable tape.

By this arrangement each roll is independent of the other, can be removed or replaced in its compartment very easily by using a bar, requires only one clerk to unroll and reroll the belt and shows up the goods to the best advantage. We find the top of the rack to be an excellent place for keeping heavy goods, such as Stone Hammers, Babbitt Metal, Bolt Ends, &c., and

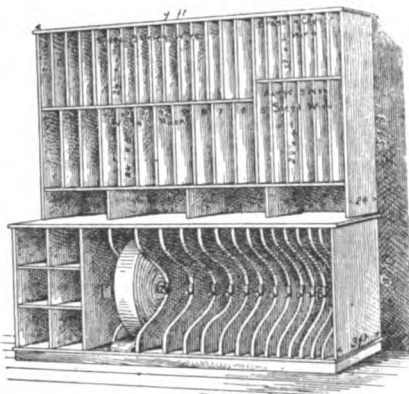


Fig. 267.—B. H. Newell & Co.'s Belt and Wire Rack.

we have utilized the space above by building a rack for retail stock of Iron, Steel, Brass and Copper Wire in coils, as shown in the cut. This rack is designed to accommodate our entire retail stock of Wire, bringing together in one place easy of access and displaying the goods very satisfactorily. Too often we find Wire stowed in out of the way corners, hung on pegs to serve as roosts for flies during the summer months, while the sizes are often mixed, taxing the patience of both the merchant and his customer when the article is called for. The top of the rack is used for extra stock of Tire Bolts, Screws, &c. At the left of the space assigned to Belting we have made tills or boxes, which, being 3 feet deep, will accommodate the longest Axe or Pick Handles.

Referring to general features in the arrangement of their store the same house give us the following information, alluding, it will be observed, to the question which has so frequently recurred, as to whether goods should be kept in the original packages or in wooden boxes:

Our shelving is supported by iron brackets instead of wooden standards. This is more satisfactory to us, for we can use all necessary space in displaying a line of goods without encroaching upon a space which the line will only partly fill. It also economizes room.

We keep our shelf goods in original packages as far as possible, and this at present means nearly our whole line, for

goods are now largely put up in convenient boxes strong enough to sample on the outside. We are afflicted with the old foggy notion that in our line a better display can be made with goods than with shelving, and therefore we use our top shelf for storing back stock, making it serve as a fancy cornice, instead of investing hard cash in a wooden one.

The Stove Trade Outlook.

A few weeks since we presented in these columns an extract from *The Metal Worker* upon the trade outlook for the near future directing attention to the importance of all manufacturers being of one mind on the subject of maintaining prices. The question is one of such obvious interest to the whole stove trade as to warrant the president of the National Association of Stove Manufacturers in addressing the members of that body through the medium of a circular letter, a copy of which we take pleasure in presenting herewith:

THE NATIONAL ASSOCIATION OF STOVE MANUFACTURERS. PRESIDENT'S OFFICE. DETROIT, MICH., AUGUST 30, 1888.

To the Members of the National Association of Stove Manufacturers.—DEAR SIR: It is with no small degree of pleasure that I feel able to congratulate you on having so well sustained the prices of your productions, especially as the volume of this year's trade has so far been a disappointment to many.

The present indications are that there will be a large demand for stoves before the close of the season, and that, on the whole, the year's business will reach its normal volume. The crop reports are especially encouraging, the total production of grain being estimated at not less than 2,000,000,000 bushels. Business throughout the country is reported fair; money circulates well, and the probability is that the demand for our goods will yet be such as will be sufficient to prevent any overstock at the end of the year. Under these conditions, there being no necessity for uneasiness through delay in marketing stoves, I recommend each manufacturer to act firmly and consistently in the maintenance of at least present prices, knowing that they are not excessive, and are such as will afford him only a fair profit for the services he renders to the public in supplying it with so necessary an article as the stove. A little impatience, a little precipitation now, may affect the market disastrously and produce results that all would deplore. I therefore urge you to maintain your prices firmly and not to allow yourselves to be influenced by hearsay statements of concessions made by competitors. It is of importance to hold the market steady. There is nothing to warrant a reduction. It is true that pig iron is a little lower than it was last year, but very little—not so much so as to effect any appreciable reduction in our cost, and the decrease is more than offset by advances in other items which necessarily enter into our productive expenses. All other articles are at least as high as they were, and certainly wages are fully up to last year's standard. Stoves cannot be made cheaper in 1888 than they could in 1887. I am desirous of corresponding with each and every manufacturer of stoves, whether a member of our National Association or not, and of receiving any suggestions on subjects connected with our trade. I shall feel under obligations to those who will favor me with their views, especially to those who interest themselves in matters connected with our association. Yours respectfully,

GEORGE H. BARBOUR, Pres't. N. A. S. M.

English Steel Sheets.—English manufacturers of steel sheets will have to send better samples of their work to this country than they are now forwarding if they hope to build up a trade here. A trial shipment, ordered some time since by a Chicago consumer, was received last week and proves to be anything but satisfactory. The sheets do not lie flat, and in many instances they are badly buckled. Some of the sheets have huge protuberances in them which look as though the sheets had been piled on stones. The surfaces are finished very roughly. In no respect do they compare at all favorably with American steel sheets of the same grade, width and gauge. The purchasers are disposed to content themselves with the result of this attempt at importing cheap foreign stock, and American manufacturers have correspondingly risen in their estimation.

Foreign Markets.

EQUIVALENTS

Franc. Peseta or Lira.....	Cents.
Florida (Netherlands).....	19.3
Florida (Austria).....	40.2
Florida (Austria).....	35.9
Milreis (Portugal).....	\$1.08
Milreis (Brazil).....	54.8
Mark (Germany).....	23.8
.....	Pounds.
Kilogram.....	220.5
Picul.....	134.

URUGUAY.

MONTEVIDEO, July 6, 1888.—*Machinery*.—The duty on Machinery is 8% ad valorem; a decree is published admitting free for a term of 10 years all textile Machinery.—*El Comercio*.

BRAZIL.

PARA. August 31, 1888.—*India Rubber*.—August shipments have been large to England and comparatively light to America—say only 155 tons.—*Per cable direct*.

CHILI.

VALPARAISO, July 6, 1888.—*Copper*.—The entire output for July and August has been sold to arrive, sales being limited to 6236 quintals on the spot at \$28.80 @ \$29.45, the outside figure equaling \$74.11 1/5, with 27/8 freight per steamer. *Nitrate*—Has been neglected during the fortnight, still producers have made concessions only in a few instances, and 383,500 quintals have changed hands at \$2.70 @ \$2.82 1/2, the inside figure equaling 8 2/3 % cwt., with 27/8 freight. June shipments amounted to 29,000 tons to Europe and 4000 to the United States; the charters during the fortnight were 56,800 tons for the former and 900 tons for the latter. *Coal* continues stiff at 55/ @ 60/, Newcastle, on the spot, and 48/ @ 50/ for April shipment, 44/ May and 37/ June. Australian, July shipments, 37/. *Exchange*, on London, 90 days, 26d.—*Weber & Co.*

JAPAN.

YOKOHAMA, August 24, 1888.—*Petroleum*.—The arrival here of an English steamer with a cargo of Russian Petroleum from Batoum has caused a decline in the price of American Petroleum in this market.—*Per cable direct*.

EAST INDIES.

SINGAPORE, July 6, 1888.—*Tin*.—There have been sold during the week some 200 tons at \$29.75 @ \$30.50, the market closing firm at \$30.75 buyers. During the first six months there have been shipped to England 91,146 piculs, against 34,610 in 1887 and 29,213 in 1886; to the Continent respectively 7594, against 15,095 and 12,326, and to the United States 12,783, 30,869 and 14,784. *Gum Damar* has been drooping; £15 has been paid for Banjar, \$20 for Palembang and \$17.50 for Mixed, while *Gum Copal* has been selling at \$7 @ \$12. *Gutta Percha* has been in active request at \$105 for good quality red; finest at \$108 @ \$110, and inferior may be had at \$23 @ \$35. *India Rubber*.—Borneo has slightly declined; a small business has been transacted in Ordinary at \$33 @ \$34.—*Giffilan, Wood & Co*

SINGAPORE, August 15, 1888.—*Tin*.—There have been shipped from the Straits Settlements to the United States during the fore part of this month 150 tons, against 450 during the corresponding period of last year, and to England 500, against 1000. The total shipments since January 1 to the United States sum up 1300, against 3250, and to England 11,100, against 8000.—*Giffilan, Wood & Co., to Charles Nordhaus, New York, per cable direct*.

MANILA, August 20, 1888.—*Hemp*.—Buyers at \$10.25 @ picul, against \$10.62 1/2 same date last year; this equals £33.15/ @ ton, cost and freight, and £35.10/ respectively. There were no clearances for the United States during the week, while last year 5000 bales cleared, and since January 1 99,000, against 138,000, leaving loading for ditto 10,000 bales against 22,000. The clearances for England since January 1 have been 230,000 bales, against 140,000; loading for do. 4000, against 6000; cleared for all other ports 47,000, against 27,000; receipts at all ports since last cable 4000, against 14,000; do., since January 1, 367,000, against 301,000 last year and 258,000 in 1886. *Freight*, \$6, against \$8. *Exchange*, 3/5, against 3/5 1/4.—*Ker & Co. to Charles Nordhaus, New York, per cable direct*

COLOMBO, July 12, 1888.—*Plumbago*.—Has been moderately active at well sustained figures, as follows, in rupees per ton: Large lumps, 145 @ 170; Ordinary ditto, 125 @ 150; Chips, 80 @ 95, and Dust, 40 @ 65. Since October 1 the shipments to England sum up 61,676 cwt.; to Marseilles 38 cwt.; to Trieste, 523; to Hamburg, 7415; to Antwerp, 3850; to Bremen, 1012; to India, 82; and to the United States 128,329; together, 202,434, against 183,331 in 1887, 142,329 in 1886 and 155,606 in 1885.

Coir Yarn has remained unaltered at 7 @ 12 rupees @ cwt. Nos. 1 to 4. *Exchange*, six months' sight on London, 1/4 1/2.—*Volkart Bros. through their Agent, John W. Greene, 82 Wall street, New York.*

AUSTRALIA.

MELBOURNE, VICTORIA, August 9, 1888.—*Iron*.—A decline has taken place in several articles. We at present quote Galvanized Iron, £16. 5/; Fence Wire, £9. 10/, and Scotch Pig, £4. 15/. Considering the dull season, sales have been tolerably brisk. *Tin*.—Shipments during the fortnight from the Continent and Tasmania only amounted to 150 tons.—*Per cable via Europe*.

CHINA.

SHANGHAI, July 3, 1888.—*Copper Coin*.—Copper Coin, the only fractional coin in circulation, is getting scarce in China, and the Government has bought Copper for increasing the coinage; new mints have been established for the purpose. There is some curiosity existing as to whether the new coin is to have its full face value. If the coin contains nearly all copper it is retained by the people and melted down; if too little there will be counterfeiting, and quite a number of private mints will begin to operate, at the establishment of which the Government did not take umbrance in former years.—*Chinese Herald*.

SPAIN.

BILBAO, August 11, 1888.—*Iron Ore*.—Only a few single cargoes have changed hands at 6/10 @ 7/3 Rubios, and 7/6 @ 8/ Campanil. As freights have been improving here it is likely that the number of vessels in search of cargo will soon increase in our port. Total shipments since January 1, meanwhile, sum up 2,363,372 tons, against 2,772,905 last year. *Pig Iron*.—There were exported during the week 2605 tons and shipped coastwise 600. We quote, spot, 57 @ 60 pesetas; futures, 55 @ 58, and Lingotillo, at Huelva or Seville, 65.—*Bilbao Maritimo y Comercial*.

GERMANY.

HAMBURG, August 25, 1888.—*Iron*.—Our Dortmund correspondent writes as follows: The increase in the stock of Pig Iron in Rhenish-Westphalia for the month of July has only been 8200 tons. Spiegel has been taken for American account to the extent of 10,000 tons, 20 % cent., which will keep busy four of our largest blast furnaces for six weeks to come. The price submitted to make the sale has been an exceedingly low one. Ten to 12 % cannot be quoted any higher than 54 marks @ ton in the open market. The Siegen rolling mills have, by this sale, been induced to buy their Forge Pig, getting it 3 marks cheaper than Rhenish-Westphalia was prepared to sell them. Bessemer has been rather dragging; Luxembourg Forge Pig is now fetching 40.30 marks; English Bessemer, 43/6. Merchant Iron has been slightly looking up both for home use and for export. Some rolling mills sold all the way into the fourth quarter. Specifications are also coming in more readily; makers are thus kept very busy, and the entire situation is an improved one; only hoop manufacturers stand in need of an export trade for the moment. Boiler Plates continue in brisk demand, thin sheets remain neglected. Wire Nail manufacturers are busier now at a decline of 1 @ 2 marks; Wire Rods are so low that to trade them would be attended with downright loss. Foundries, machine and car shops are all profitably engaged. Railroad material is moderately active.—*Borsenhalle*.

Steam car heaters will be in use on many important lines of railroad the coming winter. The entire Vanderbilt through passenger service will be equipped with engine steam heaters and the car stove abandoned. On the New York Central of its 900 passenger coaches all but about 50 are now equipped with the new heaters. The Boston and Albany is similarly equipped. For the present only the Lake Shore through trains will be provided with this new device. The Michigan Central and the Nickel Plate trains also will be equipped with steam heaters. The cost of fitting out coaches with these heaters is about \$200 each, and the expense of adapting the engines to this new service approximates the same figure. The draft upon the engine's steam is not noticeable.

The Ohio Falls Iron Works, New Albany, Ind., made an excellent run during August, not losing one day in the month. In sympathy with the trade, they have ad-

vanced prices on several sizes that were cut too low by competitors. The outlook for their fall season is good, with plenty of orders ahead.

Natural Gas Charges.—An interesting suit, the result of which will possibly determine the question as to the right of a natural gas company to charge one consumer more than another for fuel was commenced in the courts at Pittsburgh last week. The suit in question is that of the Farady Carbon Company, of that city, against the Philadelphia Natural Gas Company, for \$160.70, claimed to be overcharges for natural gas consumed by the plaintiffs. The works of the company are located in the Fifteenth Ward, in Pittsburgh, and they allege that when they negotiated with the Philadelphia Company for natural gas, which was necessary to the manufacture of their specialty, carbon points for electric lights, the agent of the company would not furnish them gas at a less rate than 85 cents per 1000 carbon points manufactured, equal to a rate of 16 cents per 1000 cubic feet of gas consumed. The plaintiffs further allege that the Philadelphia Company, by reason of illegal arrangements with other natural gas companies, were able to compel them to accept this rate under the threat that if they refused to pay it the gas supply would be shut off. During the month of July the plaintiffs manufactured 271,287 carbon points and for that month were compelled to pay defendants \$230. They claim that this price is exorbitant and greatly in excess of the rate charged other consumers, and that another factory which adjoins theirs pays 5 cents per 1000 cubic feet. They ask that the defendants be compelled to return the \$160.70 overcharged and that they also be compelled as public carriers to furnish them gas at the same rate as other consumers are charged. The outcome of the suit will be awaited with considerable interest, not only by the consumers of natural gas, but by the producers as well.

Pittsburgh Freights.—A meeting of the Pittsburgh committee of freight agents was held in that city last week to arrange the new rates from Pittsburgh to Mississippi River points, which go into effect on Monday, the 17th inst. The rates apply to points north of St. Louis, not including the latter city, and no change has been made to places that take a less rate than the Peoria rate. From Pittsburgh to Davenport, Burlington, Dubuque and Keokuk the new rates will be as follows: First-class, 66; second, 58 1/2; third, 44 1/2; fourth, 32 1/2; fifth, 28; sixth, 23 1/2; iron, in less than carloads, 24 1/2; in carloads, 19 1/2; to Quincy, 62, 54 1/2, 40, 29, 25 1/2, 21 1/2; iron, less than carloads, 24 1/2; carloads, 18; to Hannibal, 66, 59, 45, 33, 28, 23 1/2; iron, in carloads, 20; less than carloads, 24 1/2.

The new Chicago, Burlington and Quincy steel railroad bridge at Nebraska City, Neb., was formally opened on Thursday. The bridge cost \$1,500,000.

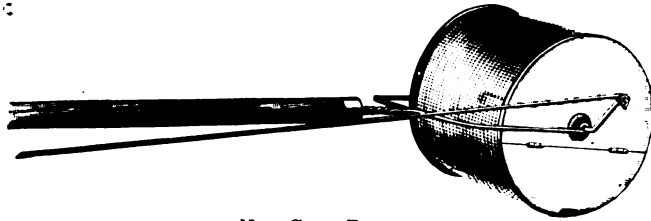
The railroad companies have given notice of an advance in freights on the 15th inst. on old rails and scrap iron between Chicago and Eastern points. The rate per ton to Cleveland will be \$2, to Youngstown \$2.25 and to Pittsburgh \$2.50. This is an increase of 40 cents to Cleveland and Youngstown and 50 cents to Pittsburgh.

Pythagoras Hall, the local headquarters of the Knights of Labor in New York, it is reported, will go into the hands of a receiver.

Tropic furnace, in the Hanging Region, started on the 30th ult.

New Corn Popper.

The Fred J. Meyers Mfg. Company, Covington, Ky., are introducing to the trade, among other seasonable specialties, a new revolving corn popper, illustrated in the accompanying engraving. The popper consists of a meshed wire cylinder 5 inches long and 13 inches in circumference, the ends being closed by metallic

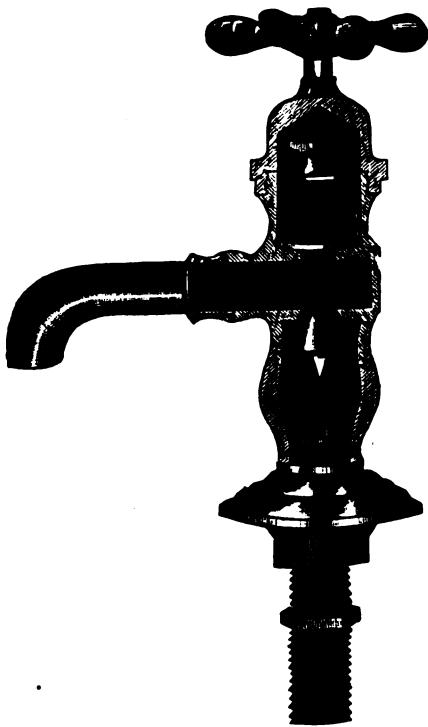


New Corn Popper.

disks through the center of which, and a bracket arm attached to a suitable handle, passes a crank-shaped rod. Attached to this crank is a long wire rod by means of which the cylinder is revolved as slowly or as rapidly as may be desired. One of the metallic disks, as shown in the illustration, is provided with a lid held in proper position by means of a small catch. The advantages claimed for the new popper are lightness, durability, and the production, by reason of the revolving motion, of more uniform results in popping corn.

The Prier Self-Closing Basin Cock.

The accompanying cut shows a sectional view of the Prier Self-Closing Basin Cock, manufactured by T. Wortley & Co., of Kansas City, for whom Frank M. Potter, 37 Howard street, Newark, N. J., is the general agent for the Middle States. A special feature of these faucets is that they



The Prier Self-Closing Basin Cock.

close with the pressure, which is held to be the only correct principle. The goods have no metal springs to relax, open easily against any pressure, and it is said always close positively even without pressure. The spout of the faucet is so constructed that no water will remain in the body of it when closed. The cushions and valves are made of the best quality of rubber and

adapted to hot or cold water. The cushions, it will be observed, answer a double purpose, that of serving as a packing and also preventing all water hammering. The goods are said never to leak at the stem. It is further noted that the cam which throws the stem down and opens the valve is solid, and consequently very durable. The value of these goods is attested by numerous testimonials from many Western

users. We are informed that the manufacturers have just placed an order from the Pullman Palace Car Company for over \$6000 worth, and we understand that they are to put them in all their cars. The faucets are made in all ordinary forms and shapes required in plumbing work.

Self Extinguishment of Fires.

A correspondent of *Engineering*, writing under the above head in a recent issue, says: There are numerous instances where fires have been extinguished through causes connected with their origin, and so completely outside of precedents that they serve as instances of the happening of the unexpected. In this connection we do not refer to the fires extinguished by automatic sprinklers, where the result is clearly what has been expected to happen. Notwithstanding the fact that when a fire occurs on property protected by automatic sprinklers, those present avail themselves of all the means of grace in the shape of the usual fire apparatus at hand, yet there are numerous instances where fires have occurred at night or in rooms vacant at the time, where the fact has been made known only by water percolating through the floors, or the sound of the automatic fire alarms, or from the sprinklers which have already come into active operation, the fire having called down means for self extinguishment. But the instances which we have in mind are those where the means of extinguishment were not expected, as in the well-known cathedral building in Boston, where a fire, caused by spontaneous ignition in a storeroom, melted the lead water-pipes, and the water issuing from them extinguished the fire. A similar instance happened in a building in Market street, Philadelphia. Some sheet mill pails were returned by the purchaser to a tinsmith in Chester, Pa., with the complaint that they were not tightly made. The manufacturer resoldered them, and in order to test his work filled them with water and hung them upon hooks at the ceiling. While the men were at dinner during the noon hour, a fire heated the upper part of the room so that the bails connecting the handles to the pails became unsoldered, and the dropping of the pails of water dashed out the fire. Some waste left upon the top of a steam pump at Watertown, Mass., blazed from spontaneous ignition, and this in turn set fire to the lagging around the steam cylinders and the feed-pipe, where it melted the soldered attachments of a continuous automatic oiler. The steam from the feed-pipe was discharged through the small tubes formerly leading to the oiler, and extinguished the fire. There have been numerous instances of fires which have ceased for want of air. During the war of the rebellion attempts were made to burn New York City, as the

result of a conspiracy fires being started in several hotels; but in order to prevent premature detection the culprits closed up the rooms so tightly that the fires were smothered. At a hotel in Woonsocket the steam pipes caused a fire in the spaces in the walls of the building, which was extinguished for want of air to support combustion. The time of the fire is unknown, as its occurrence was not discovered until some time afterward, when in the progress of an alteration to the building the facts were made apparent. It may be interesting to know that in this instance the steam-heating service was ordinarily used at a pressure of about 4 pounds to the square inch during the coldest weather, and that the safety valve was so arranged that the pressure could never exceed 10 pounds. A spark of static electricity proceeding from a belt ignited leaking gas, and this in turn set cotton on fire, which operated the automatic sprinklers and extinguished it. An attempt was made to destroy a block of new dwellings at Brooklyn, Mass., before the buildings were entirely finished. Some people, alarmed by the smoke which was seen in each division of the structure, rushed in to save doors and portable fixtures, when it was noticed that the fires did not appear to gain any headway, and when the smoke had entirely died away it was found that the incendiary had placed lighted candles in sawdust and other inflammable material in drawers and closets, but with such limited supplies of air that combustion could not be supported and the fires became smothered.

Circus Bank.

The Shepard Hardware Company, Buffalo, N. Y., are putting on the market a new toy bank, which is named the Circus. It is represented in the accompanying illustration, from which it will be inferred that it is operated by a crank, which causes the revolution of the ring with the pony and clown. The penny is placed on the bracket in such a position that the hand of the clown strikes it and causes it to fall into the bank. In connection with



Circus Bank.

the mechanism for revolving the pony there are contrivances causing the pony to kick up, the wheels to turn and the clown's arms to move up and down, making an amusing toy. The money is removed from the bank by means of a locked opening, for which a key is furnished. The dimensions of the Circus Bank are as follows: Height, 4½ inches; length, 8½ inches; width, 7 inches. It is made wholly of iron and highly polished in brilliant colors.

Interesting testimony respecting the Alaska fur seal fisheries was given before a Congressional committee in Washington last week by C. A. Williams, of New London, Conn., a member of the Alaskan Fur Seal Company, who hold a lease of the seal islands St. George and St. Paul. With an idea of presenting to the committee the actual profit derived from the seal fisheries

Mr. Williams presented a table showing that during the 16 years from 1872 to 1887 there were reshipped from London to New York dyed seal skins amounting to 825,000. The skins were sold in London in the spring and the fall of the year at market prices, and were not kept on hand to secure good prices. On these reshipments the Government collected a customs duty of \$3,123,788, or an average of \$195,236 yearly. This, added to the leased tax of

as a large counter show case. The wooden framework of this revolving case is covered with plush, and two glass doors enclose it, permitting easy inspection of the contents while preserving them from dust and the injurious action of the atmosphere. The cutlery hangs in small racks against a velvet background. A brass-headed nail under each article enables a price tag to be hung in immediate connection, which obviates the necessity of marking the cutlery it-

Hull's Coffee Roaster.

At the present day, when the practice is so generally observed of housekeepers roasting their own coffee, devices for this purpose are meeting with a demand sufficient to warrant retail dealers keeping coffee roasters in stock. As the great majority of people do not care to roast more than a pound or two at a time, small capacity roasters are preferred to the

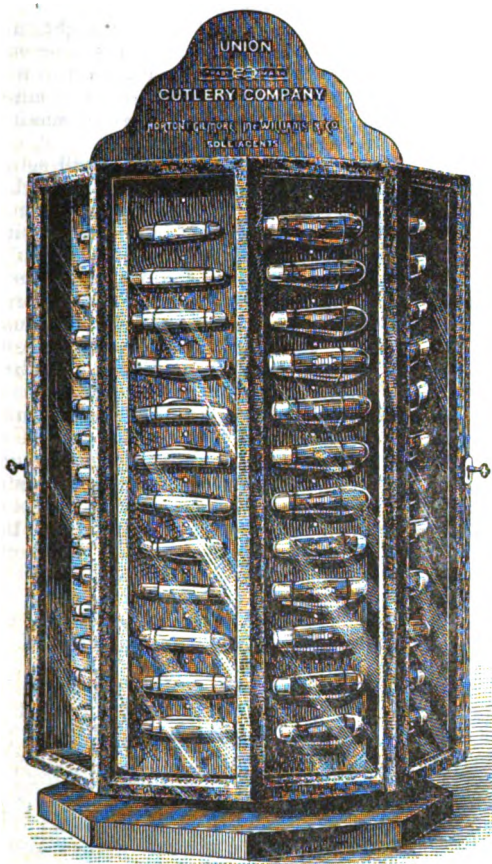


Fig. 1.—Cutlery Case, General View.

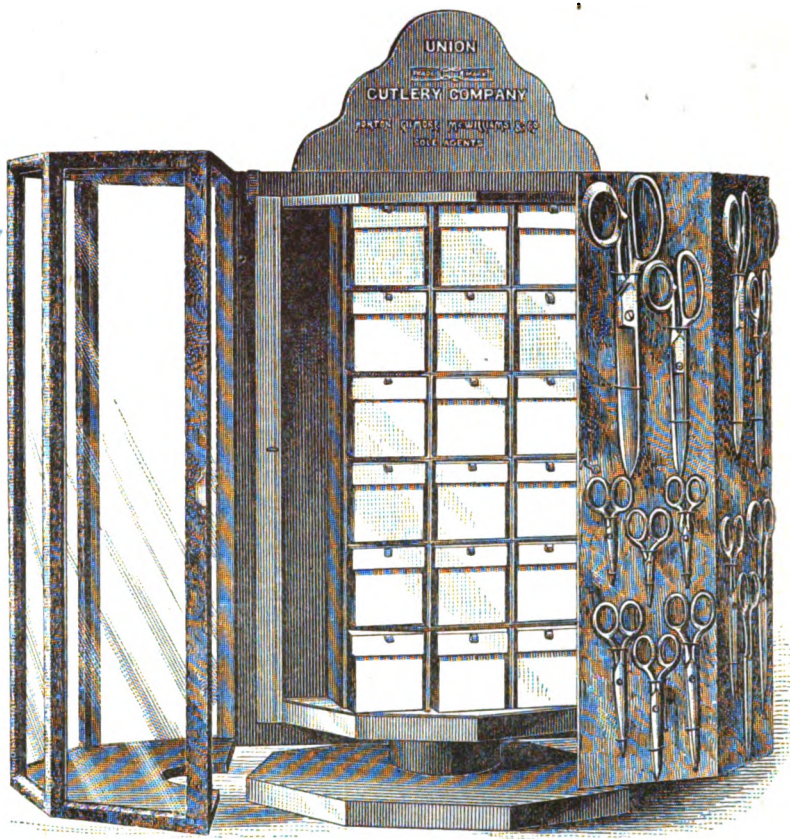


Fig. 2.—Cutlery Case, Showing Interior.

\$55,000 per year and the additional tax imposed of \$2.62½ on each skin taken, raised the annual sum realized by the Government to \$512,736. In the whole time the company had the privilege of taking seals the company had paid over \$8,000,000 to the Government, or a sum exceeding by over \$1,000,000 the price paid by the Government for the whole of Alaska, with the seal islands included. Mr. Williams said the company would prefer that the Government lease the privilege of taking the seals, because the prestige of the Government served as a protection from hostile parties and marauding seamen. The season's catch, just arrived at San Francisco, comprises 100,000 skins, valued at \$2,000,000.

The Union Cutlery Company's Show Case.

The Union Cutlery Company, controlled by Horton, Gilmore, McWilliams & Co., of Chicago, have gotten up a line of show cases which they furnish free to cutlery and jewelry purchasers when their orders cover a certain amount. So unique are these cases, and so admirably are they adapted to the purpose of displaying goods of this character, that we present herewith illustrations showing their design and interior construction. The case selected for illustration is hexagonal in shape, stands 2½ feet high, requires but a foot square of space on a counter, is made to revolve at a touch of the hand, and will hold as large a quantity of pocket knives, scissors, &c.,

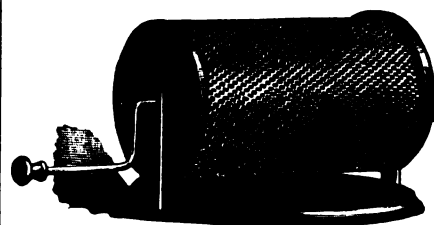
self, to its injury. One of the illustrations shows the case closed and the other shows it open, disclosing pigeon holes in the interior of sufficient capacity to carry a stock of 36 dozen pen and jack knives and 15 dozen scissors and shears. The inside doors of the case are fastened with neat brass hooks, but the outside glass doors have handsome locks. These cases are intended to stand on counters, and they form not only a very convenient receptacle for goods but also a most attractive ornament to a store. Special cases are made for jewelry. They are of somewhat similar design but of smaller size. The chain cases hold two dozen watch chains. The frames are covered with plush and the inside is lined with velvet, forming a very effective background for the chains.

A Canadian commission is at Buenos Ayres, investigating Argentine commerce, and, as the Canadian Government has voted a subsidy for a steamship line direct to Buenos Ayres, it is thought the two countries can do some trading.

Heat, Light and Power, of Philadelphia, well known as the progressive representative of the gas industries, announces that it has become a weekly journal. Mr. George W. Graeff, Jr., continues as managing editor.

According to the *Electrical Engineer*, Mr. E. Blass, a German scientist, has used an incandescent lamp for actual inspection of the inside of boilers under steam.

larger ones. In order to meet what appears to be a well-defined demand, Mr. M. L. Hull, of Cleveland, Ohio, has brought out a coffee roaster of 1 pound capacity, a general view of which is shown in the accompanying illustration. It consists of a cylinder of perforated metal supported by two standards having a stove lid as a base. The cylinder is turned by means of a crank clearly shown in the cut,

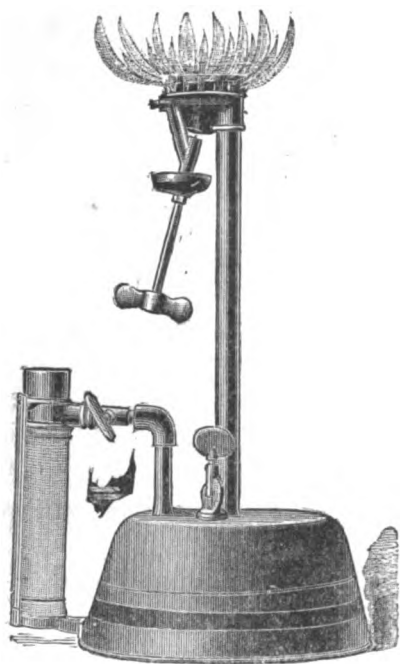


Hull's Coffee Roaster.

and it is claimed that coffee can be roasted in from 15 to 20 minutes. It is designed for use on gasoline stoves, but will work with equal satisfaction on coal or wood-burning constructions. The perforations are small, yet of sufficient size to enable the operator to see the coffee as it is roasting. When the coffee is thoroughly roasted it may be allowed to remain in the roaster while cooling, or it may be turned out, as preferred. The roaster shown above has a capacity of 1 pound.

Plumbers' Torch.

A very convenient torch for bench use of any kind, as well as for plumbers, is being offered the trade by M. L. Hull, of No. 50 Long street, Cleveland, Ohio. A very good idea of its general arrangement and construction may be gained from an inspection of the engraving presented herewith. It is shown arranged for using gasoline as a fuel, although it can be supplied with a coal oil torch burner if desired. The handle is hollow, and furnishes the air to the burner. It is only necessary to compress the handle a few times to maintain a steady, bright light. The manufacturer claims that this torch is especially adapted for plumbers' use in working in dark corners where it is difficult to secure a good light. It is also designed for use by railroad men about freight yards, for inspection of car wheels and other work



Hull's Plumbers' and Bench Torch.

about railroad stations. The broad, flat base of the gasoline reservoir forms a good foundation, and adapts it for bench use of almost any description. It is well built, compact, and is offered the trade at a reasonable figure.

The Merchant Steel Association.

The regular monthly meeting of the Merchant Steel Association of the United States, composed of the open-hearth and crucible steel manufacturers, was held in the Monongahela House, Pittsburgh, on Wednesday, the 29th ult. There was a very fair attendance, considerably more than half of the members being represented. The different reports were read, and a general discussion on the condition of the trade took place. It was admitted that the steel trade was in very satisfactory condition, with good prospects for the future. The extras adopted at the meeting held on June 1, last, and published in a subsequent issue of *The Iron Age*, were reaffirmed. No other business was transacted. The next meeting of the association will be held at the call of the secretary.

Southern Pig Iron Rates.—The Queen and Crescent Route, via the Alabama Great Southern and the Cincinnati Southern Railways, has issued a supplement to tariff No. 7, giving new rates on pig iron to Burlington and Davenport, Iowa, and Moline and Rock Island, Ill. The rate to these points from Chattanooga, Rising

Fawn, Florence and Sheffield is \$4.75. From Dayton and Rockwood it is \$4.55. The rate from Attalla, Bessemer, Birmingham, Gadsden and Wheeling, Ala., to Burlington, Iowa, is \$5, and to Davenport, Moline and Rock Island, Ill., \$5.02.

The Columbia Rolling Mill.

Last month the Columbia Rolling Mill Company opened their new works on the corner of Fourteenth street and Jersey avenue, Jersey City, N. J. The Columbia Rolling Mill Company were organized under the laws of the State of New Jersey. The capital stock of the company amounts to \$500,000 and is divided as follows: Common stock, \$400,000; preferred stock, \$100,000. There are 100,000 shares at a value of \$5 per share, which is fully paid and unassessable. The following gentlemen are the officers and directors: Jesse Larrabee, president, who is also a director of the Pennsylvania and Slatington Railroad; Weeks W. Culver, vice-president, who is also treasurer of the Barnegat and Long Beach Improvement Company, of New York; John M. Guiteau, ex-Judge Advocate of the U. S. Navy; Silas B. Dutcher, president of the Union Dime Savings Bank, of New York, and W. L. Brockaway, directors; W. A. Crawford, secretary; R. I. Powell, treasurer, and W. L. Brockaway, general manager. The company, succeeding to an established business of over five years' growth, were organized for the purpose of utilizing and manufacturing from waste material, which can be gathered in all large cities, what is called taggers iron, taggers tin and ferro-type plates.

The new buildings of the rolling company occupy six lots of ground. There are four buildings used in the business. They are 75 x 100, 50 x 100, 20 x 25, 30 x 25. This same company has been in successful operation on Goerick street, New York, for a long time. Owing to the increase in their business they moved to Jersey City in order to have more room. They will employ a force of about 100 men when they get in complete working order. Two 75 horse-power boilers will be put in the building and two 50 horse-power engines, besides four chilled-iron rolls.

The process employed for producing a valuable product from waste material of this character is very simple, consisting essentially in heating the material from three to five minutes, which has the effect of burning off all extraneous material and rendering it suitable for further treatment. In the bottom of each of these heating furnaces is a small hole, which allows the solder or lead to run into a receiving basin. About 200 pounds of lead is thus obtained from a ton of waste material. This lead is sold at a price not exceeding 16 cents a pound. But it is now proposed by the company to manufacture this tin into what is called putty powder. This will then bring a price of about 90 cents a pound. This putty powder is principally used for polishing marble.

After the waste material has been taken from the furnace and allowed to cool, the scrap is sorted, the smaller pieces being thrown out and used for other purposes, such as lids for blacking boxes, &c. The sheet metal is now passed under a rubber coated roll, which flattens it out, the rubber being used so that the sheets are not hardened, which would require them to be annealed. The metal, in packs containing several sheets each, is next passed between chilled iron rolls, which reduce the thickness. They are then annealed and repressed through the same rolls and trimmed up to the finished size, after which they are given their final annealing, when they are sorted and ready for shipment. The taggers iron, as thus produced, may now be further finished by being japanned, tinned,

galvanized or otherwise treated, depending upon the use for which it is designed to be put.

Adding to the Water Supply of Chicago.

Preparations for the launching on Lake Michigan of the caisson for the new crib, which will add to the water supply of Chicago, are being actively pushed. Two hundred and fifty tons of steel were used in the construction of the caisson. It is a double steel shell, 54 feet in height, the outer shell being 75 feet and the inner one 31 feet in diameter. The caisson will rest on four scows. It will be towed 2½ miles out in the lake, when the work of sinking it will begin.

The engineer thinks that it will settle at least 3 feet on account of its weight. However, the space between the inner and outer shell will be filled and packed with sand. Then by means of chains, hydraulic power and hoisting engines, the caisson will be lifted off the scows and lowered into the water. Four series of soundings have been made and have proved successful. When the caisson will have reached the ground two divers with hose and nozzles of great power will walk around the structure and tear up the ground so that there will be no difficulty in its sinking. If this does not prove successful the crib will be loaded down with rock. The place selected for the sinking of the shaft is considered by the engineers the safest. The depth of the lake at this point is 42 feet. This will leave the caisson about 9 feet above the level of the water. The shaft will be sunk inside the caisson, commencing from the top and building downward. The shaft will be 10 feet wide. On either side of the shaft in the crib will be three floors. The upper one will be of cast iron. Apartments will be fitted up on the first floor for the laborers, who will remain there during the winter months. The second and third floors will be used as storage rooms for hoisting and hydraulic machinery. It is also the intention of the contractors to have a dynamo on one of the floors in order to light the shaft and apartments by electric light. Four crews of 50 men will be quartered in the caisson. The contractor will have a tug commissioned to run between the shore and the crib, making two trips by day and the same at night. The shaft sunk inside the caisson will form an inlet for the lake water, which will flow through it into a tunnel connecting with the pumping machinery on the shore, by means of which the water will be distributed throughout the city.

Another very fine swing bridge has just been completed at Chicago. It was built by the Keystone Bridge Company and crosses the Chicago River at Jackson street. The turntable of this bridge is built on the side of the river channel, and the bridge is long enough to swing over a number of railroad tracks running alongside. It is built of steel, and is 280 feet long, 59 feet wide and 36 feet high, and the footways are 7 feet wide and the roadways 16 feet. It weighs about 700 tons, and the engine about 150 tons more. The engine is 15 horse-power. The floor of the engine-house is fire-proof. The bridge moves so easily that two men could turn it by the hand-key. It cost \$131,632.67.

The Augusta National Exposition which will open at Augusta, Ga., on October 10 and close on November 17, will be the largest that the South has ever held. Preparations for it are now being vigorously carried out and give promise of a successful issue.

CURRENT HARDWARE PRICES.

SEPTEMBER 5, 1888.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers' name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers at the figures named.

Ammunition.

Caps, Percussion, 1000—	
Black & Goldmark's	
F. L. Waterproof, 1-10's	50¢
E. B. Trimm'd Edge, 1-10's	25¢
E. B. Ground Edge, Central Fire, 1-10's	7½¢
Double Waterproof, 1-10's	51.40
Marked Waterproof, 1-10's	50¢
G. D.	30¢
E. B.	30¢

Union Metallic Cartridge Co.

F. O. Trimm'd	50¢
F. L. Ground	55¢
Can. Fire Ground	70¢
Double Waterproof, 1-10's	51.40
Double Waterproof, 1-10's	51.40
E. B. Genuine Imported	45¢
Key's E. B.	54¢
Key's D Waterproof, Central Fire	51.00

Cartridges.

Bin Fire Cartridges	dis 50¢52¢
Bin Fire Military	dis 15¢25¢
Central Fire, Pistol and Rifle	dis 25¢52¢
Central Fire, Military & Sporting	dis 15¢25¢
Blank Cartridge, except 23 and 33 cal., an additional 10% over above discounts.	
Blank Cartridges, 33 cal.	\$1.75, dis 25¢
Blank Cartridges, 33 cal.	\$3.50, dis 25¢
Primed Shells and Bullets	dis 15¢
E. B. Caps, Box and Ball	\$1.75, dis 25¢
E. B. Caps, Conical Ball, Swaged	\$2.00, dis 25¢

Primers.

Berdan Primers all sizes, and E. L. Caps (for Starrevant Shells)	\$1.00, dis 25¢
All other Primers, all sizes	\$1.30, dis 25¢

Shells.

First quality, 4, 8, 10 and 12 gauge, dis 25¢10¢2¢	
First quality, 14, 16 and 20 gauge (\$10 list)	dis 30¢10¢2¢
Star, Club, Rival and 10 gauge, \$0.11 list	dis 38½¢
Climax Brands, 12 gauge, \$8 list	\$10.2¢
Club, Rival and Climax Brands, 14, 16 and 20 gauge	dis 30¢10¢2¢
Seibold's Combination Shot Shells	dis 15¢25¢
Brass Shot Shells, 1st quality	dis 60¢25¢
Brass Shot Shells, Club, Rival, Climax	dis 65¢25¢
A. R. & C. Co., I. X. L., 10 & 12 gauge, dis 40¢10¢2¢	
A. B. & C. Co., "Special," 14 gauge, dis 30¢10¢2¢	
A. R. & C. Co., "Special," 10 & 12 gauge, dis 40¢10¢2¢	
Powder's Patent, 10 & 12 gauge, \$1.00	\$3.75

List No. 19, 1887.

U. M. C. & W. R. A.—B. E., 11 up	\$2.00
U. M. C. & W. R. A.—B. E., 9210	2.30
U. M. C. & W. R. A.—B. E., 725	2.60
U. M. C. & W. R. A.—B. E., 11 up	2.10
U. M. C. & W. R. A.—B. E., 9210	4.00
U. M. C. & W. R. A.—B. E., 725	4.90
Key's B. E., 11 up	\$1.75
Key's P. E., 11 up	\$2.30
A. Willis, Eagle Anvil	\$1.00, dis 30¢
Peter Wright's	94¢
Armstrong's Mouse Hole	94¢
Armstrong's Mouse Hole, Extra	94¢
Freeman	94¢
Wilkinson	94¢
J. & Riley Carr, Patent Solid	11¢11¢
Anvil Vice and Drill	
Millers Falls Co.	\$1.00, dis 30¢
Cheney Anvil and Vice	dis 30¢
Allen Combined Anvil and Vice	\$3, dis 40¢10¢
Moore & Barnes Mfg. Co.	dis 33½¢

Augers and Bits.

Douglas Mfg. Co.	
New Haven Copper Co.	
Wm. A. Ives Co.	dis 70¢
Humphreysville Mfg. Co.	
French, Swift & Co. (P. H. Beecher)	
Cook's, Douglas Mfg. Co.	dis 55¢
Cook's, New Haven Copper Co.	dis 50¢10¢50¢10¢25¢
Ives' Circular Lip	dis 60¢
Patent Solid Head	dis 80¢
C. E. Jennings & Co., No. 10, extension lip	dis 40¢
C. E. Jennings & Co., No. 30	dis 60¢
C. E. Jennings & Co., Auger Bits, in fancy boxes	
Set, 3¼ quarters, No. 5, 6, 8, 10, 30, 35	dis 20¢
Lowie's Patent Single Twist	dis 45¢
Russell Jennings' Augers and Bits	dis 25¢
Imitation Jennings' Bits (new dist.)	dis 60¢50¢25¢
Fugh's Black	dis 40¢10¢50¢
Car Bits	dis 15¢10¢50¢
Commodore Car Bits	dis 15¢10¢
Forster Pat. Auger Bits	dis 10¢
Collins Augers	
Ives	dis 25¢10¢
French, Swift & Co.	dis 25¢10¢
Douglas	dis 40¢10¢
Bonmer's Adjustable \$100	dis 40¢10¢
Stearns	dis 30¢10¢
Ives' Expansive, each \$4.50	dis 40¢10¢
Universal Expansive, each \$4.50	dis 30¢
Wood's	dis 30¢

Sawing Bits.

Clark's small, 118; large, 98	dis 35¢
Ives' No. 4, per doz.	dis 35¢
Swan's	dis 40¢
Stearns, No. 1, 98; No. 2, 98	dis 35¢
Stearns' No. 3, 98	dis 30¢
Common	dis 30¢
Diamond	dis 30¢
See "P."	dis 30¢
Double Out, Stearns' No. 1	dis 45¢
Double Out, Stearns' No. 2	dis 45¢
Double Out, Stearns' No. 3	dis 45¢
Double Out, Hartwell's, \$1.00	dis 35¢
Double Out, Douglas	dis 40¢10¢
Double Out, Ives	dis 60¢

Sawing Bits.

Marine Twist Drills	dis 50¢10¢25¢
Standard	dis 50¢10¢25¢
Cleveland	dis 50¢10¢25¢
Syracuse, for metal	dis 50¢10¢25¢
Syracuse, for wood (wood list)	dis 30¢
Williams' or Holt's, for metal	dis 50¢10¢25¢
Williams' or Holt's, for wood	dis 40¢10¢
Ship Augers and Bits	
W. H. Mendenhall's	dis 15¢10¢
W. H. Mendenhall's	dis 15¢10¢
Small's Ship Auger Pat's Car Bits	dis 15¢10¢

Awl Points.

Swing, Brass Ferrule	\$2.50 \$ gross—dis 45¢10¢
Patent Sewing, Short	\$1.00 \$ gross—dis 40¢10¢
Patent Sewing, Long	\$1.30 \$ gross—dis 40¢10¢

Patent Peg, Plain Top.

Patent Peg, Plain Top	\$10.00 \$ gross—dis 45¢10¢
Patent Peg, Leather Top	\$12.00 \$ gross—dis 45¢10¢
Awls, Brad Sets, &c.	
Awls, Sewing, Common	\$ gross \$1.70—dis 35¢
Awls, Shouldered Peg	\$ gross \$2.45—dis 40¢40¢10¢
Awls, Patent Peg	\$ gross \$3—dis 40¢40¢10¢
Awls, Shouldered Brad	\$2.70 \$ gross—dis 35¢
Awls, Handled Brad	\$7.50 \$ gross—dis 45¢
Awls, Handled Scratch	\$7.50 \$ gross—dis 45¢
Awls, Socket Scratch	\$1.50 \$ gross—dis 35¢

Awls and Tool Sets.

Awls and Tool Sets	
Awls and Tool Sets, No. 20	\$10—dis 50¢10¢
Awls and Tool Sets, No. 1, 112; 2, 112; 3, 112; 4, 112	dis 25¢25¢10¢
Miller's Falls Ad. Tool Hdls., Nos. 1, 112; 2, 112; 3, 112; 4, 112	\$10—dis 50¢10¢
Miller's Falls Ad. Tool Hdls., Nos. 1, 112; 2, 112; 3, 112; 4, 112	\$10—dis 50¢10¢
Miller's Falls Ad. Tool Hdls., Nos. 1, 112; 2, 112; 3, 112; 4, 112	\$10—dis 50¢10¢

Awls and Tool Sets.

Awls and Tool Sets	
Awls and Tool Sets, No. 20	\$10—dis 50¢10¢
Awls and Tool Sets, No. 1, 112; 2, 112; 3, 112; 4, 112	dis 25¢25¢10¢
Miller's Falls Ad. Tool Hdls., Nos. 1, 112; 2, 112; 3, 112; 4, 112	\$10—dis 50¢10¢
Miller's Falls Ad. Tool Hdls., Nos. 1, 112; 2, 112; 3, 112; 4, 112	\$10—dis 50¢10¢
Miller's Falls Ad. Tool Hdls., Nos. 1, 112; 2, 112; 3, 112; 4, 112	\$10—dis 50¢10¢

Awls and Tool Sets.

Awls and Tool Sets	
Awls and Tool Sets, No. 20	\$10—dis 50¢10¢
Awls and Tool Sets, No. 1, 112; 2, 112; 3, 112; 4, 112	dis 25¢25¢10¢
Miller's Falls Ad. Tool Hdls., Nos. 1, 112; 2, 112; 3, 112; 4, 112	\$10—dis 50¢10¢
Miller's Falls Ad. Tool Hdls., Nos. 1, 112; 2, 112; 3, 112; 4, 112	\$10—dis 50¢10¢
Miller's Falls Ad. Tool Hdls., Nos. 1, 112; 2, 112; 3, 112; 4, 112	\$10—dis 50¢10¢

Awls and Tool Sets.

Awls and Tool Sets	
Awls and Tool Sets, No. 20	\$10—dis 50¢10¢
Awls and Tool Sets, No. 1, 112; 2, 112; 3, 112; 4, 112	dis 25¢25¢10¢
Miller's Falls Ad. Tool Hdls., Nos. 1, 112; 2, 112; 3, 112; 4, 112	\$10—dis 50¢10¢
Miller's Falls Ad. Tool Hdls., Nos. 1, 112; 2, 112; 3, 112; 4, 112	\$10—dis 50¢10¢
Miller's Falls Ad. Tool Hdls., Nos. 1, 112; 2, 112; 3, 112; 4, 112	\$10—dis 50¢10¢

Awls and Tool Sets.

Awls and Tool Sets	
Awls and Tool Sets, No. 20	\$10—dis 50¢10¢
Awls and Tool Sets, No. 1, 112; 2, 112; 3, 112; 4, 112	dis 25¢25¢10¢
Miller's Falls Ad. Tool Hdls., Nos. 1, 112; 2, 112; 3, 112; 4, 112	\$10—dis 50¢10¢
Miller's Falls Ad. Tool Hdls., Nos. 1, 112; 2, 112; 3, 112; 4, 112	\$10—dis 50¢10¢
Miller's Falls Ad. Tool Hdls., Nos. 1, 112; 2, 112; 3, 112; 4, 112	\$10—dis 50¢10¢

Awls and Tool Sets.

Awls and Tool Sets	
Awls and Tool Sets, No. 20	\$10—dis 50¢10¢
Awls and Tool Sets, No. 1, 112; 2, 112; 3, 112; 4, 112	dis 25¢25¢10¢
Miller's Falls Ad. Tool Hdls., Nos. 1, 112; 2, 112; 3, 112; 4, 112	\$10—dis 50¢10¢
Miller's Falls Ad. Tool Hdls., Nos. 1, 112; 2, 112; 3, 112; 4, 112	\$10—dis 50¢10¢
Miller's Falls Ad. Tool Hdls., Nos. 1, 112; 2, 112; 3, 112; 4, 112	\$10—dis 50¢10¢

Awls and Tool Sets.

Awls and Tool Sets	
Awls and Tool Sets, No. 20	\$10—dis 50¢10¢
Awls and Tool Sets, No. 1, 112; 2, 112; 3, 112; 4, 112	dis 25¢25¢10¢
Miller's Falls Ad. Tool Hdls., Nos. 1, 112; 2, 112; 3, 112; 4, 112	\$10—dis 50¢10¢
Miller's Falls Ad. Tool Hdls., Nos. 1, 112; 2, 112; 3, 112; 4, 112	\$10—dis 50¢10¢
Miller's Falls Ad. Tool Hdls., Nos. 1, 112; 2, 112; 3, 112; 4, 112	\$10—dis 50¢10¢

Awls and Tool Sets.

Awls and Tool Sets	
Awls and Tool Sets, No. 20	\$10—dis 50¢10¢
Awls and Tool Sets, No. 1, 112; 2, 112; 3, 112; 4, 112	dis 25¢25¢10¢
Miller's Falls Ad. Tool Hdls., Nos. 1, 112; 2, 112; 3, 112; 4, 112	\$10—dis 50¢10¢
Miller's Falls Ad. Tool Hdls., Nos. 1, 112; 2, 112; 3, 112; 4, 112	\$10—dis 50¢10¢
Miller's Falls Ad. Tool Hdls., Nos. 1, 112; 2, 112; 3, 112; 4, 112	\$10—dis 50¢10¢

Awls and Tool Sets.

Awls and Tool Sets	
Awls and Tool Sets, No. 20	\$10—dis 50¢10¢
Awls and Tool Sets, No. 1, 112; 2, 112; 3, 112; 4, 112	dis 25¢25¢10¢
Miller's Falls Ad. Tool Hdls., Nos. 1, 112; 2, 112; 3, 112; 4, 112	\$10—dis 50¢10¢
Miller's Falls Ad. Tool Hdls., Nos. 1, 112; 2, 112; 3, 112; 4, 112	\$10—dis 50¢10¢
Miller's Falls Ad. Tool Hdls., Nos. 1, 112; 2, 112; 3, 112; 4, 112	\$10—dis 50¢10¢

Carriage.

Carriage	
Com. list June 10, '84	dis 75¢52¢
Genuine Eagle, list Oct. '84	dis 75¢10¢
Phila. pattern, list Oct. 7, '84	dis 75¢10¢75¢10¢25¢
N. B. & W. old list	dis 70¢

Common list Feb. 23, 1883.

Common list Feb. 23, 1883	dis 70¢
P. C. B. & N. Co., Empire list Feb. 23, 1883	dis 70¢
P. C. B. & N. Co., Philadel. list Oct. '84	dis 83½¢
P. C. B. & N. Co., Keystone, Phil. list Oct. '84	dis 80¢
P. C. B. & N. Co., Norway, Phil. list Oct. '84	dis 75¢10¢
Am. S. Co., Norway, Phil. list Oct. '84	dis 75¢10¢
Am. S. Co., Bagla, Phil. list Oct. '84	dis 80¢
Am. S. Co., Philadel. list Oct. 16, '84	dis 87½¢
Am. S. Co., Bag State, list Feb. 23, '83	dis 70¢
R. B. & W., Philadel. list Oct. 16, 1884	dis 82¢
R. B. & W. Mfg. Co., Stove	dis 70¢

Stove and Flow.

Stove and Flow	
Stove	dis 62½¢
Flow	dis 60¢25¢
Am. S. Co. Stove, Annealed	dis 62½¢
R. B. & W.	dis 62½¢
R. B. & W. Stove	dis 62½¢
R. B. & W. Mfg. Co., Stove	dis 62½¢
Machine	dis 75¢10¢
Bolt Ends	dis 75¢10¢

Berax.

Berax	dis 70¢10¢
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Sewing Machines.

Sewing Machines	
Without Augers, Upright	
Douglas	\$5.50
Snell's, Rice's Patent	\$5.50
Jennings	\$5.50
Other Machines	\$5.50
Phillips' Pat., with Augers 7.00	\$7.00

Sew Pins.

Sew Pins	
Humason, Beckley & Co's	dis 60¢10¢
Sargent & Co's	dis 60¢10¢
Peck, Stow & W. Co.	dis 60¢10¢
Brasses	
Backus, Nos. 110 to 114 and 81 to 83	dis 60¢50¢10¢
Backus, Nos. 8, 12, 14	dis 60¢10¢25¢
Backus, Nos. 10, 12, 14, 22, 7, 5, 11	dis 70¢10¢25¢
Barber's, Nos. 10 to 16	dis 50¢
Barber's, Nos. 30 to 33	dis 50¢
Barber's, Nos. 40 to 63	dis 50¢10¢
Rarker's, Nos. 5, 10 and 12	dis 75¢10¢80¢
Rarker's, Plated, Nos. 5, 10 and 12	dis 65¢10¢70¢
Osgood's Ratchet	dis 40¢10¢25¢
Spofford's	dis 40¢10¢
Ives' New Haven Novelty	dis 70¢
Ives' New Haven Ratchet	dis 6-25¢
Ives' Barber Ratchet	dis 60¢10¢
Ives' Barbers	dis 60¢25¢
Ives' Spofford	dis 60¢25¢
Common Ball, American	\$1.10
Bartholomew's, Nos. 25, 27, 30	dis 50¢10¢
Bartholomew's, Nos. 117, 118, 119	dis 70¢
Amidon's Barker's Imp'd Pin	dis 75¢10¢
Amidon's Barker's Imp. Nickle	dis 65¢10¢
Amidon's Ratchet	dis 75¢10¢
Amidon's Eclipse Ratchet	dis 60¢
Amidon's Globe Jawed	dis 40¢10¢25¢
Amidon's Corner Brace	dis 40¢
Amidon's Universal	\$1.10
Amidon's Buffalo Ball	\$1.10
P. S. & W.	dis 50¢10¢

Snackets.

Snackets	
Shelf, plain, Sargent's list	dis 55¢10¢
Shelf, fancy, Sargent's list	dis 60¢10¢
Reading, plain	dis 60¢10¢
Reading, Rosette	dis 60¢10¢
Bright Wire Goods	dis 35¢
Shellers	\$1.10
Henis' Self Basting	\$1.10
Buckets	dis 55¢
Shells	dis 55¢
Sargent's	dis 60¢10¢
Hotchkiss' low list	dis 30¢
Humason, Beckley & Co's	dis 70¢
Peck, Stow & W. Co's	dis 60¢10¢
Kilrich Hd. Co., White Metal, low list	dis 60¢10¢

Butcher's Cleavers.

Butcher's Cleavers	
Bradley's	dis 25¢
L. & J. White	dis 25¢
Beatty's	dis 40¢
1	5
2	5
3	5
4	5
5	5
6	5
7	5
8	5
9	5
10	5
11	5
12	5
13	5
14	5
15	5
16	5
17	5
18	5
19	5
20	5
21	5</

World's Best. # gross, No. 1, \$12.00; No. 2, \$8.00.
No. 3, \$5.00. # dis 10 @ 10 @ 10
Universal. # gross, No. 1, \$12.00; No. 2, \$8.00.
Domestic. # gross, No. 1, \$12.00; No. 2, \$8.00.
Champion. # gross, No. 1, \$12.00; No. 2, \$8.00.

Cards.
Horse and Curry. # dis 10 @ 10 @ 10
Cotton. # New list, Aug., 1888, dis 10 @ 10 @ 10
Wool. # dis 10 @ 10 @ 10

Carpet Stretchers.
Cast Steel, Polished. # dis 12.50
Cast Iron, Steel Points. # dis 8.00
Sockets. # dis 12.50
Bullard's. # dis 25 @ 25 @ 10

Carpet Sweepers.
Russell No. 5. # dis 17.00
Russell No. 7 New Drop Pan. # dis 19.00
Russell Grand. # dis 25.00
Grand Rapids. # dis 24.00
Crown Jewel. No. 1, \$15; No. 2, \$10; No. 3, \$20
Jewel. # dis 17.00
Mystic. # dis 16.00
Cottage. # dis 15.00
Garland. # dis 18.00
Parlor Queen. # dis 15.00
Housewife's Delight. # dis 15.00
Queen, with band. # dis 18.00
King. # dis 18.00
Weed Improved. # dis 18.00
Hub. # dis 18.00
Cog Wheel. # dis 18.00

Cartridges—See Ammunition.
Casters.
Bed. # New list. # dis 55 @ 55 @ 55
Plate. # Brass. # dis 55 @ 55 @ 55
Shallow Socket. # Others. # dis 60 @ 60 @ 60
Deep Socket. # dis 10 @ 10 @ 10
Yale Casters, list May, 1884. # dis 80 @ 10 @ 40
Yale, Gem. # dis 60 @ 60 @ 60
Hart's Patent (Phoenix). # dis 60 @ 60 @ 60
Payson's All Friction. # dis 60 @ 60 @ 60
"Giant" Truck Casters. # dis 10 @ 10 @ 5
Stationary Truck Casters. # dis 45 @ 10

Oattle Lenders.
Hudson, Beckley & Co.'s. # dis 70
Sargent's. # dis 60 @ 10
Hochkiss. # dis 80
Fool Stow & W. Co. # dis 50 @ 10

Ullain.
Trace, 6-10-2, exact sizes, # pair. \$1.05 # dis 50 @ 10 @ 25
Trace, 6-10-3, exact sizes, # pair. # dis 50 @ 10 @ 25
Trace, 7-10-2, exact sizes, # pair. 1.11 # dis 50 @ 10 @ 25

Log, Fifth, Stretcher, and other fancy Chains, list Nov. 1, 1884. # dis 50 @ 10 @ 50
American Co. 3-16 5-16 7-16 9-16 11-16 13-16 15-16 17-16 19-16 21-16 23-16 25-16 27-16 29-16 31-16 33-16 35-16 37-16 39-16 41-16 43-16 45-16 47-16 49-16 51-16 53-16 55-16 57-16 59-16 61-16 63-16 65-16 67-16 69-16 71-16 73-16 75-16 77-16 79-16 81-16 83-16 85-16 87-16 89-16 91-16 93-16 95-16 97-16 99-16 101-16 103-16 105-16 107-16 109-16 111-16 113-16 115-16 117-16 119-16 121-16 123-16 125-16 127-16 129-16 131-16 133-16 135-16 137-16 139-16 141-16 143-16 145-16 147-16 149-16 151-16 153-16 155-16 157-16 159-16 161-16 163-16 165-16 167-16 169-16 171-16 173-16 175-16 177-16 179-16 181-16 183-16 185-16 187-16 189-16 191-16 193-16 195-16 197-16 199-16 201-16 203-16 205-16 207-16 209-16 211-16 213-16 215-16 217-16 219-16 221-16 223-16 225-16 227-16 229-16 231-16 233-16 235-16 237-16 239-16 241-16 243-16 245-16 247-16 249-16 251-16 253-16 255-16 257-16 259-16 261-16 263-16 265-16 267-16 269-16 271-16 273-16 275-16 277-16 279-16 281-16 283-16 285-16 287-16 289-16 291-16 293-16 295-16 297-16 299-16 301-16 303-16 305-16 307-16 309-16 311-16 313-16 315-16 317-16 319-16 321-16 323-16 325-16 327-16 329-16 331-16 333-16 335-16 337-16 339-16 341-16 343-16 345-16 347-16 349-16 351-16 353-16 355-16 357-16 359-16 361-16 363-16 365-16 367-16 369-16 371-16 373-16 375-16 377-16 379-16 381-16 383-16 385-16 387-16 389-16 391-16 393-16 395-16 397-16 399-16 401-16 403-16 405-16 407-16 409-16 411-16 413-16 415-16 417-16 419-16 421-16 423-16 425-16 427-16 429-16 431-16 433-16 435-16 437-16 439-16 441-16 443-16 445-16 447-16 449-16 451-16 453-16 455-16 457-16 459-16 461-16 463-16 465-16 467-16 469-16 471-16 473-16 475-16 477-16 479-16 481-16 483-16 485-16 487-16 489-16 491-16 493-16 495-16 497-16 499-16 501-16 503-16 505-16 507-16 509-16 511-16 513-16 515-16 517-16 519-16 521-16 523-16 525-16 527-16 529-16 531-16 533-16 535-16 537-16 539-16 541-16 543-16 545-16 547-16 549-16 551-16 553-16 555-16 557-16 559-16 561-16 563-16 565-16 567-16 569-16 571-16 573-16 575-16 577-16 579-16 581-16 583-16 585-16 587-16 589-16 591-16 593-16 595-16 597-16 599-16 601-16 603-16 605-16 607-16 609-16 611-16 613-16 615-16 617-16 619-16 621-16 623-16 625-16 627-16 629-16 631-16 633-16 635-16 637-16 639-16 641-16 643-16 645-16 647-16 649-16 651-16 653-16 655-16 657-16 659-16 661-16 663-16 665-16 667-16 669-16 671-16 673-16 675-16 677-16 679-16 681-16 683-16 685-16 687-16 689-16 691-16 693-16 695-16 697-16 699-16 701-16 703-16 705-16 707-16 709-16 711-16 713-16 715-16 717-16 719-16 721-16 723-16 725-16 727-16 729-16 731-16 733-16 735-16 737-16 739-16 741-16 743-16 745-16 747-16 749-16 751-16 753-16 755-16 757-16 759-16 761-16 763-16 765-16 767-16 769-16 771-16 773-16 775-16 777-16 779-16 781-16 783-16 785-16 787-16 789-16 791-16 793-16 795-16 797-16 799-16 801-16 803-16 805-16 807-16 809-16 811-16 813-16 815-16 817-16 819-16 821-16 823-16 825-16 827-16 829-16 831-16 833-16 835-16 837-16 839-16 841-16 843-16 845-16 847-16 849-16 851-16 853-16 855-16 857-16 859-16 861-16 863-16 865-16 867-16 869-16 871-16 873-16 875-16 877-16 879-16 881-16 883-16 885-16 887-16 889-16 891-16 893-16 895-16 897-16 899-16 901-16 903-16 905-16 907-16 909-16 911-16 913-16 915-16 917-16 919-16 921-16 923-16 925-16 927-16 929-16 931-16 933-16 935-16 937-16 939-16 941-16 943-16 945-16 947-16 949-16 951-16 953-16 955-16 957-16 959-16 961-16 963-16 965-16 967-16 969-16 971-16 973-16 975-16 977-16 979-16 981-16 983-16 985-16 987-16 989-16 991-16 993-16 995-16 997-16 999-16 1001-16 1003-16 1005-16 1007-16 1009-16 1011-16 1013-16 1015-16 1017-16 1019-16 1021-16 1023-16 1025-16 1027-16 1029-16 1031-16 1033-16 1035-16 1037-16 1039-16 1041-16 1043-16 1045-16 1047-16 1049-16 1051-16 1053-16 1055-16 1057-16 1059-16 1061-16 1063-16 1065-16 1067-16 1069-16 1071-16 1073-16 1075-16 1077-16 1079-16 1081-16 1083-16 1085-16 1087-16 1089-16 1091-16 1093-16 1095-16 1097-16 1099-16 1101-16 1103-16 1105-16 1107-16 1109-16 1111-16 1113-16 1115-16 1117-16 1119-16 1121-16 1123-16 1125-16 1127-16 1129-16 1131-16 1133-16 1135-16 1137-16 1139-16 1141-16 1143-16 1145-16 1147-16 1149-16 1151-16 1153-16 1155-16 1157-16 1159-16 1161-16 1163-16 1165-16 1167-16 1169-16 1171-16 1173-16 1175-16 1177-16 1179-16 1181-16 1183-16 1185-16 1187-16 1189-16 1191-16 1193-16 1195-16 1197-16 1199-16 1201-16 1203-16 1205-16 1207-16 1209-16 1211-16 1213-16 1215-16 1217-16 1219-16 1221-16 1223-16 1225-16 1227-16 1229-16 1231-16 1233-16 1235-16 1237-16 1239-16 1241-16 1243-16 1245-16 1247-16 1249-16 1251-16 1253-16 1255-16 1257-16 1259-16 1261-16 1263-16 1265-16 1267-16 1269-16 1271-16 1273-16 1275-16 1277-16 1279-16 1281-16 1283-16 1285-16 1287-16 1289-16 1291-16 1293-16 1295-16 1297-16 1299-16 1301-16 1303-16 1305-16 1307-16 1309-16 1311-16 1313-16 1315-16 1317-16 1319-16 1321-16 1323-16 1325-16 1327-16 1329-16 1331-16 1333-16 1335-16 1337-16 1339-16 1341-16 1343-16 1345-16 1347-16 1349-16 1351-16 1353-16 1355-16 1357-16 1359-16 1361-16 1363-16 1365-16 1367-16 1369-16 1371-16 1373-16 1375-16 1377-16 1379-16 1381-16 1383-16 1385-16 1387-16 1389-16 1391-16 1393-16 1395-16 1397-16 1399-16 1401-16 1403-16 1405-16 1407-16 1409-16 1411-16 1413-16 1415-16 1417-16 1419-16 1421-16 1423-16 1425-16 1427-16 1429-16 1431-16 1433-16 1435-16 1437-16 1439-16 1441-16 1443-16 1445-16 1447-16 1449-16 1451-16 1453-16 1455-16 1457-16 1459-16 1461-16 1463-16 1465-16 1467-16 1469-16 1471-16 1473-16 1475-16 1477-16 1479-16 1481-16 1483-16 1485-16 1487-16 1489-16 1491-16 1493-16 1495-16 1497-16 1499-16 1501-16 1503-16 1505-16 1507-16 1509-16 1511-16 1513-16 1515-16 1517-16 1519-16 1521-16 1523-16 1525-16 1527-16 1529-16 1531-16 1533-16 1535-16 1537-16 1539-16 1541-16 1543-16 1545-16 1547-16 1549-16 1551-16 1553-16 1555-16 1557-16 1559-16 1561-16 1563-16 1565-16 1567-16 1569-16 1571-16 1573-16 1575-16 1577-16 1579-16 1581-16 1583-16 1585-16 1587-16 1589-16 1591-16 1593-16 1595-16 1597-16 1599-16 1601-16 1603-16 1605-16 1607-16 1609-16 1611-16 1613-16 1615-16 1617-16 1619-16 1621-16 1623-16 1625-16 1627-16 1629-16 1631-16 1633-16 1635-16 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1887-16 1889-16 1891-16 1893-16 1895-16 1897-16 1899-16 1901-16 1903-16 1905-16 1907-16 1909-16 1911-16 1913-16 1915-16 1917-16 1919-16 1921-16 1923-16 1925-16 1927-16 1929-16 1931-16 1933-16 1935-16 1937-16 1939-16 1941-16 1943-16 1945-16 1947-16 1949-16 1951-16 1953-16 1955-16 1957-16 1959-16 1961-16 1963-16 1965-16 1967-16 1969-16 1971-16 1973-16 1975-16 1977-16 1979-16 1981-16 1983-16 1985-16 1987-16 1989-16 1991-16 1993-16 1995-16 1997-16 1999-16 2001-16 2003-16 2005-16 2007-16 2009-16 2011-16 2013-16 2015-16 2017-16 2019-16 2021-16 2023-16 2025-16 2027-16 2029-16 2031-16 2033-16 2035-16 2037-16 2039-16 2041-16 2043-16 2045-16 2047-16 2049-16 2051-16 2053-16 2055-16 2057-16 2059-16 2061-16 2063-16 2065-16 2067-16 2069-16 2071-16 2073-16 2075-16 2077-16 2079-16 2081-16 2083-16 2085-16 2087-16 2089-16 2091-16 2093-16 2095-16 2097-16 2099-16 2101-16 2103-16 2105-16 2107-16 2109-16 2111-16 2113-16 2115-16 2117-16 2119-16 2121-16 2123-16 2125-16 2127-16 2129-16 2131-16 2133-16 2135-16 2137-16 2139-16 2141-16 2143-16 2145-16 2147-16 2149-16 2151-16 2153-16 2155-16 2157-16 2159-16 2161-16 2163-16 2165-16 2167-16 2169-16 2171-16 2173-16 2175-16 2177-16 2179-16 2181-16 2183-16 2185-16 2187-16 2189-16 2191-16 2193-16 2195-16 2197-16 2199-16 2201-16 2203-16 2205-16 2207-16 2209-16 2211-16 2213-16 2215-16 2217-16 2219-16 2221-16 2223-16 2225-16 2227-16 2229-16 2231-16 2233-16 2235-16 2237-16 2239-16 2241-16 2243-16 2245-16 2247-16 2249-16 2251-16 2253-16 2255-16 2257-16 2259-16 2261-16 2263-16 2265-16 2267-16 2269-16 2271-16 2273-16 2275-16 2277-16 2279-16 2281-16 2283-16 2285-16 2287-16 2289-16 2291-16 2293-16 2295-16 2297-16 2299-16 2301-16 2303-16 2305-16 2307-16 2309-16 2311-16 2313-16 2315-16 2317-16 2319-16 2321-16 2323-16 2325-16 2327-16 2329-16 2331-16 2333-16 2335-16 2337-16 2339-16 2341-16 2343-16 2345-16 2347-16 2349-16 2351-16 2353-16 2355-16 2357-16 2359-16 2361-16 2363-16 2365-16 2367-16 2369-16 2371-16 2373-16 2375-16 2377-16 2379-16 2381-16 2383-16 2385-16 2387-16 2389-16 2391-16 2393-16 2395-16 2397-16 2399-16 2401-16 2403-16 2405-16 2407-16 2409-16 2411-16 2413-16 2415-16 2417-16 2419-16 2421-16 2423-16 2425-16 2427-16 2429-16 2431-16 2433-16 2435-16 2437-16 2439-16 2441-16 2443-16 2445-16 2447-16 2449-16 2451-16 2453-16 2455-16 2457-16 2459-16 2461-16 2463-16 2465-16 2467-16 2469-16 2471-16 2473-16 2475-16 2477-16 2479-16 2481-16 2483-16 2485-16 2487-16 2489-16 2491-16 2493-16 2495-16 2497-16 2499-16 2501-16 2503-16 2505-16 2507-16 2509-16 2511-16 2513-16 2515-16 2517-16 2519-16 2521-16 2523-16 2525-16 2527-16 2529-16 2531-16 2533-16 2535-16 2537-16 2539-16 2541-16 2543-16 2545-16 2547-16 2549-16 2551-16 2553-16 2555-16 2557-16 2559-16 2561-16 2563-16 2565-16 2567-16 2569-16 2571-16 2573-16 2575-16 2577-16 2579-16 2581-16 2583-16 2585-16 2587-16 2589-16 2591-16 2593-16 2595-16 2597-16 2599-16 2601-16 2603-16 2605-16 2607-16 2609-16 2611-16 2613-16 2615-16 2617-16 2619-16 2621-16 2623-16 2625-16 2627-16 2629-16 2631-16 2633-16 2635-16 2637-16 2639-16 2641-16 2643-16 2645-16 2647-16 2649-16 2651-16 2653-16 2655-16 2657-16 2659-16 2661-16 2663-16 2665-16 2667-16 2669-16 2671-16 2673-16 2675-16 2677-16 2679-16 2681-16 2683-16 2685-16 2687-16 2689-16 2691-16 2693-16 2695-16 2697-16 2699-16 2701-16 2703-16 2705-16 2707-16 2709-16 2711-16 2713-16 2715-16 2717-16 2719-16 2721-16 2723-16 2725-16 2727-16 2729-16 2731-16 2733-16 2735-16 2737-16 2739-16 2741-16 2743-16 2745-16 2747-16 2749-16 2751-16 2753-16 2755-16 2757-16 2759-16 2761-16 2763-16 2765-16 2767-16 2769-16 2771-16 2773-16 2775-16 2777-16 2779-16 2781-16 2783-16 2785-16 2787-16 2789-16 2791-16 2793-16 2795-16 2797-16 2799-16 2801-16 2803-16 2805-16 2807-16 2809-16 2811-16 2813-16 2815-16 2817-16 2819-16 2821-16 2823-16 2825-16 2827-16 2829-16 2831-16 2833-16 2835-16 2837-16 2839-16 2841-16 2843-16 2845-16 2847-16 2849-16 2851-16 2853-16 2855-16 2857-16 2859-16 2861-16 2863-16 2865-16 2867-16 2869-16 2871-16 2873-16 2875-16 2877-16 2879-16 2881-16 2883-16 2885-16 2887-16 2889-16 2891-16 2893-16 289

Climax Steel Anti-Friction..... dis 50 5
Zenith for Wood Track..... dis 55 5
Reed's Steel Arm..... dis 55 5
Challenge, Barn Door..... dis 55 5
Searing Improved (Anti-Friction)..... dis 55 5
Sector, No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 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1182, 1183, 1184, 1185, 1186, 1187, 1188, 1189, 1190, 1191, 1192, 1193, 1194, 1195, 1196, 1197, 1198, 1199, 1200, 1201, 1202, 1203, 1204, 1205, 1206, 1207, 1208, 1209, 1210, 1211, 1212, 1213, 1214, 1215, 1216, 1217, 1218, 1219, 1220, 1221, 1222, 1223, 1224, 1225, 1226, 1227, 1228, 1229, 1230, 1231, 1232, 1233, 1234, 1235, 1236, 1237, 1238, 1239, 1240, 1241, 1242, 1243, 1244, 1245, 1246, 1247, 1248, 1249, 1250, 1251, 1252, 1253, 1254, 1255, 1256, 1257, 1258, 1259, 1260, 1261, 1262, 1263, 1264, 1265, 1266, 1267, 1268, 1269, 1270, 1271, 1272, 1273, 1274, 1275, 1276, 1277, 1278, 1279, 1280, 1281, 1282, 1283, 1284, 1285, 1286, 1287, 1288, 1289, 1290, 1291, 1292, 1293, 1294, 1295, 1296, 1297, 1298, 1299, 1300, 1301, 1302, 1303, 1304, 1305, 1306, 1307, 1308, 1309, 1310, 1311, 1312, 1313, 1314, 1315, 1316, 1317, 1318, 1319, 1320, 1321, 1322, 1323, 1324, 1325, 1326, 1327, 1328, 1329, 1330, 1331, 1332, 1333, 1334, 1335, 1336, 1337, 1338, 1339, 1340, 1341, 1342, 1343, 1344, 1345, 1346, 1347, 1348, 1349, 1350, 1351, 1352, 1353, 1354, 1355, 1356, 1357, 1358, 1359, 1360, 1361, 1362, 1363, 1364, 1365, 1366, 1367, 1368, 1369, 1370, 1371, 1372, 1373, 1374, 1375, 1376, 1377, 1378, 1379, 1380, 1381, 1382, 1383, 1384, 1385, 1386, 1387, 1388, 1389, 1390, 1391, 1392, 1393, 1394, 1395, 1396, 1397, 1398, 1399, 1400, 1401, 1402, 1403, 1404, 1405, 1406, 1407, 1408, 1409, 1410, 1411, 1412, 1413, 1414, 1415, 1416, 1417, 1418, 1419, 1420, 1421, 1422, 1423, 1424, 1425, 1426, 1427, 1428, 1429, 1430, 1431, 1432, 1433, 1434, 1435, 1436, 1437, 1438, 1439, 1440, 1441, 1442, 1443, 1444, 1445, 1446, 1447, 1448, 1449, 1450, 1451, 1452, 1453, 1454, 1455, 1456, 1457, 1458, 1459, 1460, 1461, 1462, 1463, 1464, 1465, 1466, 1467, 1468, 1469, 1470, 1471, 1472, 1473, 1474, 1475, 1476, 1477, 1478, 1479, 1480, 1481, 1482, 1483, 1484, 1485, 1486, 1487, 1488, 1489, 1490, 1491, 1492, 1493, 1494, 1495, 1496, 1497, 1498, 1499, 1500, 1501, 1502, 1503, 1504, 1505, 1506, 1507, 1508, 1509, 1510, 1511, 1512, 1513, 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2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210

Cable Laid Italian "	.....	7 25 @ 130
India Cable Laid "	.....	7 130
Silver Lake, A Quality, White.....	504. dis	1041042 1/2
Silver Lake, A Quality, Drab.....	504. dis	1041042 1/2
Silver Lake, B Quality, White.....	504. dis	1041042 1/2
Silver Lake, B Quality, Drab.....	504. dis	1041042 1/2
Silver Lake, C Quality, White (only).....	374 @ 25	
Sylvan Spring, Extra Braided, White.....	344	
Sylvan Spring, Extra Braided, Drab.....	344	
Semper Idem, Braided, White.....	304	
Egyptian, India Hemp, Braided.....	324	
Samson, Braided, White Cotton.....	504 dis 30 @	304 1/2
Samson, Braided, Drab Cotton.....	504 dis 30 @	304 1/2
Samson Braided Italian Hemp.....	504 dis 30 @	304 1/2
Samson Braided Linen.....	504 dis 30 @	304 1/2
Sash Locks.		
Clark's No. 1, \$10.00; No. 2, \$6.00 1/2 gross.....	dis 25 1/2	
Morris and Triumpha, list Aug. 14, 1884.....	dis 32 1/2	
Victor.....	6041042 1/2	
Walker.....	dis 10 1/2	
Attwell Mfg. Co.....	dis 25 @ 35 1/2	
Reading.....	dis 66 1/2 @ 104 1/2	
Hammond's Window Springs.....	dis 40	
Hammond's Case, Jan. 4, Cop'd and Br'ed.....	dis 110 1/2	
Common Sense, Nickel Plated.....	dis 30 1/2	
Universal.....	dis 30 1/2	
Kemshall's Gravity.....	dis 60	
Kemshall's Model.....	dis 60 @ 40 1/2	
Corbin's Daisy, list February 15, 1884.....	dis 70 1/2	
Payson's Perfect.....	dis 60 @ 60 1/2	
Hugobin's New and Improved Adjustable Sash Lock.....	dis 25 1/2 @ 25 1/2	
Goodall, list Jan. 5, 1884.....	dis 25 1/2 @ 25 1/2	
Hugobin's New Sash Locks, list Jan. 5, '87.....	dis 25 1/2 @ 25 1/2	
Stoddard "Practical".....	dis 30 1/2	
Ives Patent.....	dis 30 1/2	
Liesche's Nos. 100 & 110 1/2 gro. 85; 106. \$10. dis	30 1/2	
Davis, Bronze, Barnes Mfg. Co.....	dis 60	
Champion Safety, list March 1, 1884.....	dis 55 @ 25 1/2	
Security.....	dis 70 1/2	
Sash Weights.		
Solid Eyes.....	7 ton. 32 1/2	
Sausage Stuffers or Fillers.		
Miles' "Challenge".....	7 dos. 32, dis	50 @ 50 1/2
Perry.....	7 dos. No. 1, \$15; No. 2, \$21. dis	50 @ 50 1/2
Draw Cut Mfg.....	each \$30.00, dis	30
Enterprise Mfg. Co.....	dis 30 1/2 @	30 1/2
Worcester.....	dis 40 1/2 @	30 1/2
Saws.		
Diston's Circular.....	dis 45 @ 45 1/2 1/2	
Diston's Cross Cuts, dis 45 @ 45 1/2 1/2	times given by	jobbers.
Diston's Hand.....	dis 25 @ 25 1/2 1/2	
Atkins' Circular.....	dis 50 1/2	
Atkins' Special Steel Diamond X Cuts.....	7 foot 50 1/2	
Atkins' Special Steel Dexter X Cuts.....	7 foot 50 1/2	
Atkins' Special Steel Diamond X Cuts.....	7 foot 50 1/2	
Atkins' Champion and Electric Tooth X Cuts.....	7 foot 50 1/2	
Atkins' Hoggle Back X Cuts.....	7 foot 18 1/2	
Atkins' Shingle, Mulay, Drag, &c.....	dis 44 1/2	
W. M. & C. Co. Circular X Cuts.....	dis 30 1/2 @ 30 1/2	
W. M. & C. Co. X Cuts, Thin Back.....	7 foot 27 @ 27 1/2	
Peace Circular and Mill.....	dis 45 @ 45 1/2	
Peace Hand Panel and Rip.....	dis 30 1/2 @ 30 1/2	
Peace Cross Cuts, Standard.....	7 foot 27 @ 27 1/2	
Peace Cross Cuts, Thin Back.....	7 foot 27 @ 27 1/2	
Richardson's Circular and Mill.....	dis 45 @ 45 1/2	
Diston's X-Cuts, No. 1, 304; No. 2, 374; No. 3, 344	dis 30 1/2 @ 30 1/2	
Saw Saws.		
Griffin's Hack Saw, complete.....	dis 40 1/2 @ 50 1/2	
Griffin's Hack Saw, Blades only.....	dis 40 1/2 @ 50 1/2	
Star Hack Saws and Blades.....	dis 25 1/2	
Diamond Hack Saws and Blades.....	dis 25 1/2	
Eureka and Crescent.....	dis 25 1/2	
Saw Frames.		
White Vermont.....	7 gro 90 @	310
Red, Polished, and Varished.....	7 dos \$1.50, dis	25 1/2
Saw Sets.		
Stillman's Genuine.....	7 dos \$5.00 and \$7.75, dis	40 1/2
Stillman's Imita.....	7 dos \$3.25 and \$5.25, dis	40 1/2 @ 40 1/2
Common Lever.....	7 dos \$2.00, dis	40 1/2
Morrill's No. 1, \$15.00; Nos. 2 & 4, \$24.....	dis 40 1/2 @ 40 1/2	
Leach's.....	No. 1, \$2.00; No. 1, \$15.00, dis	15 @ 40 1/2
Hammer.....	dis 40 1/2 @ 40 1/2	
Hammer, Hotchkiss.....	dis 40 1/2 @ 40 1/2	
Hammer, Bemis & Call Co.'s new Patent.....	dis 40 1/2 @ 40 1/2	
Bemis & Call Co.'s Lever and Spring Hammer.....	dis 40 1/2 @ 40 1/2	
Bemis & Call Co.'s Plate.....	dis 40 1/2	
Bemis & Call Co.'s Cross Cut.....	dis 12 1/2 @ 40 1/2	
Atken's Genuine.....	dis 40 1/2 @ 40 1/2	
Atken's Station.....	7 foot, dis	40 1/2
Hatch Patented.....	dis 40 1/2 @ 40 1/2	
Diston's, Star, 32, No. 15, \$5.50, dis	40 1/2 @ 40 1/2	
Atkins' Lever.....	per dos No. 1, \$3.00; No. 2, \$3.00	
Atkins' Criterion.....	per dos \$7.50	
Croissant Keller, No. 1, \$15.00; No. 2, \$24.00, dis	33 1/2 @ 10 1/2	
Saw Tees.		
Atkins Perfection.....	\$15.00; Excelsior \$6.00, dis	30 1/2
Scales.		
Hatch, Counter, No. 171, good quality.....	dis 25 @ 25 1/2	
Hatch, Tea, No. 161.....	7 dos \$3.75 @ \$7.00	
Union Platform, Plain.....	\$2.10 @ 2.30	
Union Platform, Striped.....	\$2.30 @ 2.30	
Chatillon's Grocers' Trip Scales.....	dis 25 1/2	
Chatillon's Eureka.....	dis 25 1/2	
Chatillon's Favorite.....	dis 25 1/2	
Family, Turballe.....	dis 30 @ 30 1/2	
Scale Beams.		
Scale Beams, list of Jan. 12, 22. dis	50 1/2 @ 50 1/2 1/2	
Chatillon's No. 1.....	dis 50 1/2	
Chatillon's No. 2.....	dis 50 1/2	
Scrapers.		
Atkins' Box Scraper (B. R. & L. Co.) \$9.50, dis	30 1/2 @ 30 1/2	
Box, 1 Handle.....	7 dos \$4.00, dis	18 1/2
Box, 2 Handle.....	7 dos \$5.00, dis	18 1/2
Defiance Box and Ship.....	dis 30 1/2	
Foot.....	dis 50 1/2 @ 50 1/2	
Ship, Common.....	7 dos \$3.50 net	
Ship, Providence Tool Co.....	dis 10 1/2	
Screen Window and Door Frames.		
Porter's Pat. Window and Door Frames.....	dis 35 @ 35 1/2	
Screen Corner Irons, Warner's.....	dis 33 1/2 @ 33 1/2 1/2	
Stearns' Frames and Corners.....	dis 35 @ 35 1/2	
Screw Drivers.		
Douglas Mfg Co.....	dis 20 1/2 @ 20 1/2	
Diston's Patent Excelsior.....	dis 45 1/2 @ 45 1/2	
Buck Bros.....	dis 22 1/2	
Stanley R. & L. Co.'s Varished Handles.....	dis 65 1/2 @ 65 1/2	
Stanley R. & L. Co.'s Black Handles.....	dis 60 1/2 @ 60 1/2	
Sargent & Co's No. 1 Forged Blade.....	dis 70 1/2 @ 70 1/2	
Sargent & Co's No. 20.....	dis 60 1/2 @ 60 1/2 1/2	
Sargent & Co's Nos. 40 & 30, Cast Steel.....	dis 70 1/2 @ 70 1/2	
Sargent & Co's No. 60 Round Blade.....	dis 70 1/2 @ 70 1/2	
Sargent & Co's No. 1 Extra.....	dis 60 @ 60 1/2	
Knapp & Cowles' No. 00 & s.....	dis 50 1/2 @ 50 1/2 1/2	
Stearns'.....	dis 25 1/2 @ 25 1/2	
Gay & Parsons.....	dis 35 1/2	
Champion.....	dis 30 1/2 @ 30 1/2	
Clark's Patent.....	dis 30 1/2 @ 30 1/2	
Conrad's Patent.....	dis 30 1/2 @ 30 1/2	
Elmhurst's Socket and Ratchet.....	dis 25 @ 25 1/2	
Allard's Spiral, new list.....	dis 35 1/2	
Kolb's Common Sense.....	7 dos 35, dis	25 1/2

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SEPTEMBER 13, 1888.

IRON AND STEEL.

Bar Iron from Store.

Merchant Steel from Store.

For Classification and Extras adopted by the Merchant Steel Association of the United States. June 1, 1888, see *The Iron Age*, June 21, 1888.

Sheet Iron from Store.

English Steel from Store.			
Best Cast.		15	¢
Extra Cast.	10 1/2	17	¢
Swaged Cast.		18	¢
Best Double Shear		15	¢
Blister, 1st quality		18 1/2	¢
German Steel, Best.		10	¢
9d quality.		9	¢
8d quality		8	¢
Sheef Cast Steel, 1st quality.		15	¢
2d quality.		14	¢
3d quality.		12 1/2	¢

METALS.

Tin Plates.

<i>Coke Plates.—Bright.</i>		
Steel Coke.—IC, 10 x 14, 14 x 20.....	\$5.00 @	...
10 x 20.....	7.50 @	7.65
20 x 28.....	10.25 @	...
IX, 10 x 14, 14 x 20.....	...	5.75
BV Grade.—IC, 10 x 14, 14 x 20.....	4.70 @	...

Tin Boiler Plates.

Copper.

	<i>Ingot.</i>	
Lake.....		@ 17.50¢
"Anchor" Brand.....		@ 17¢

ban	ban	ban	Weights per square foot and prices per pound.
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Circles over 18 inches diameter are not classed as Copper Bottoms.

Tinning.
 sheets on one side.

round Stops, Hydrant Cocks, &c.....	55&10&2
orporation Cocks.....	55&10&2

Red Indian Dry 9 ② 124
Rose Pink 10 ②

THE IRON AGE

THURSDAY, SEPTEMBER 13, 1888.

New Horizontal Boring Mill.

The E. W. Bliss Company, of Brooklyn, N. Y., recently built for their own use a horizontal boring mill which, however, is adapted to general shop work, and may therefore be of some interest to our readers. Accordingly, we present in this issue elevations and several details illustrating the principle features of the tool. By its use holes may be bored parallel to each other in heavy work without resetting the work, and without "traveling" the latter

screws S S, by means of which the positions of the head and tail blocks can be quickly adjusted, and in a manner similar to that used to raise or lower a planer crosshead. To compensate for any possible variation in the two vertical adjusting screws, a slight independent adjustment is provided in the tail block, so as to bring the boring-bar dead true with the bed. The driving cone pulley P is made with four steps instead of three, as shown in the details, and a heavy back gear is attached to the spindle, thus giving eight

2 are thrown into gear, and the motion from A and M is then carried to the larger of the upper wheels, thence to the smaller one, the two being on the same shaft, and finally down again to the wheel N and the spindle G. The driving belt, it will be noticed, is arranged in a rather striking manner, passing from the pulley B, first over the two idlers F F, then over the spindle pulley A, and thence back around B. This allows the raising and lowering of the head-block without entailing any difficulty with the belt, requiring no change of

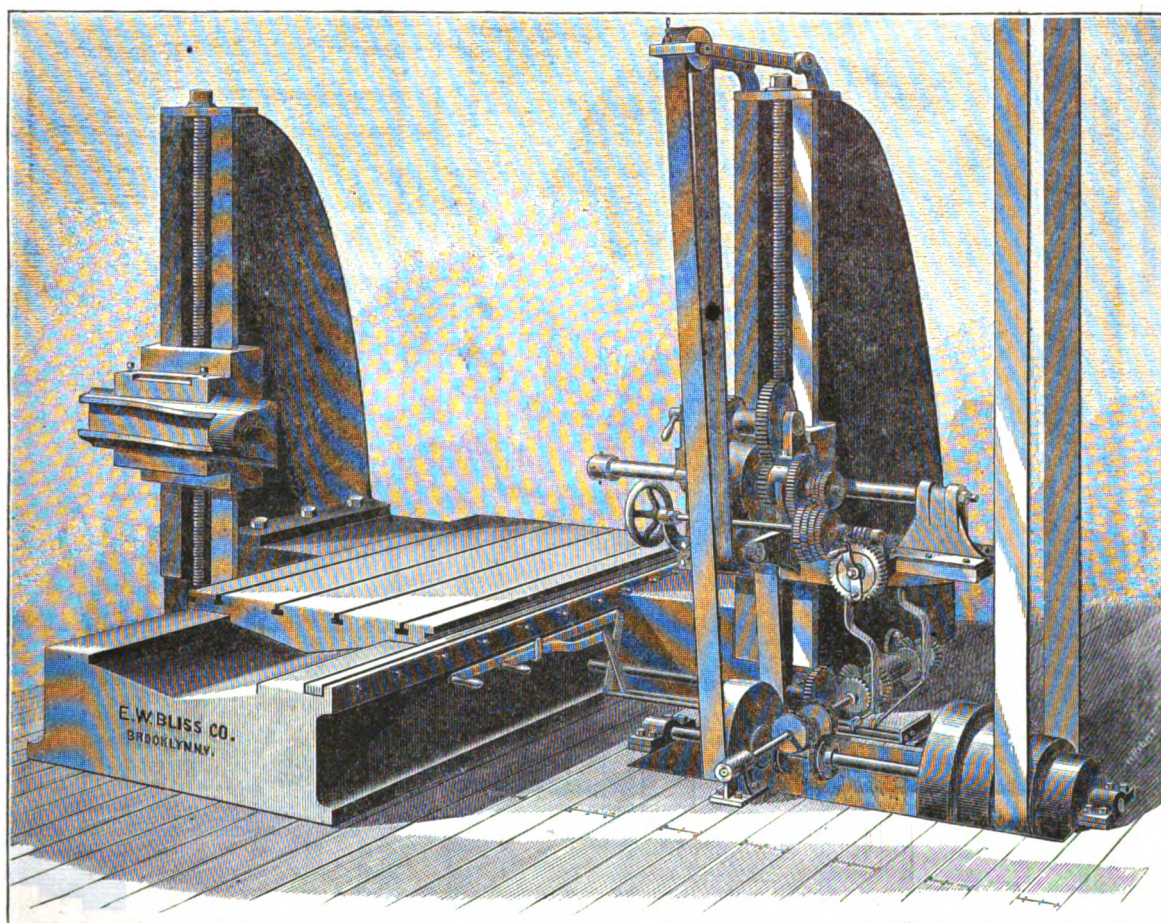


Fig. 1.—General View.

NEW HORIZONTAL BORING MILL, BUILT BY THE E. W. BLISS CO., BROOKLYN, N. Y

during the process of boring, and it is so arranged that, while built especially for heavy duty, it can be used to great advantage on light work, as all hand-wheels and levers are convenient to the operator in his position on the right-hand side of the machine.

The table is 7 feet long by 3 feet wide, and can be "traveled" to bring the work in position by means of a rack driven by power. This is thrown in operation by the lever C (Fig. 3), and which operates a bevel wheel clutch through the intervention of the rod D. The clutch wheels are mounted on a short shaft which takes power from the driving shaft and pulley B, in the manner shown. A second bevel-wheel clutch, controlled by the lever C', enables the operator to impart motion in either direction, through a spur-wheel attachment, to a transverse shaft E (Figs. 2 and 3). This, in turn, works the elevating

speeds for the bar. A cross-section of the spindle back gear arrangement is given in Fig. 4. The pulley A, it will be observed, is secured to a collar with a pinion M cut on its end, and capable of turning loosely on a bush on the spindle G. The gear N, on the other hand, is tightly secured to this bushing, which itself is secured to the spindle G by a groove and feather arrangement, so that while the bushing may move freely along the spindle it must impart to it its rotary motion. When running in single gear, therefore, the gear N is secured to the pulley A by the bolts shown, and partakes of its motion, transmitting it directly to the spindle G. The pinion M is not in gear with any wheel during this time. In running with the back gear, however, the bolts holding the wheels N and A together are loosened, permitting of their free and independent motion. The two upper gear-wheels shown in Fig.

length. The spindle carrying the boring-bar is of steel, $3\frac{1}{4}$ inches in diameter and has 24-inch feed lengthwise. It is carried by a head with 60 inches vertical adjustment upon a strong upright securely attached to the bed and the cutter end of the bar is supported through a bush carried by the tail-block upon a similar upright at the left of the machine. The spindle is fed forward by a rack and pinion driven by a worm gear, W W', and so arranged that the latter may be thrown out, allowing the bar to be run back quickly by hand. This feeding device is driven through gearing from the main spindle and has four rates of feed. This detail of the arrangement is shown in Fig. 5, the feed-wheels K (Fig. 2) being loosely mounted on the feed-spindle and secured individually, as many desired, by a feather, b, moved along a slot in the spindle by the milled head a. When the feed-wheels

are out of gear the attendant may feed the spindle along by hand through the hand-wheel L (Figs. 2 and 3), which, as shown, is mounted on the feed-spindle and controls the worm W and worm-wheel W'. The end of the spindle rests in the support H, which, as noted, is furnished with a rack underneath.

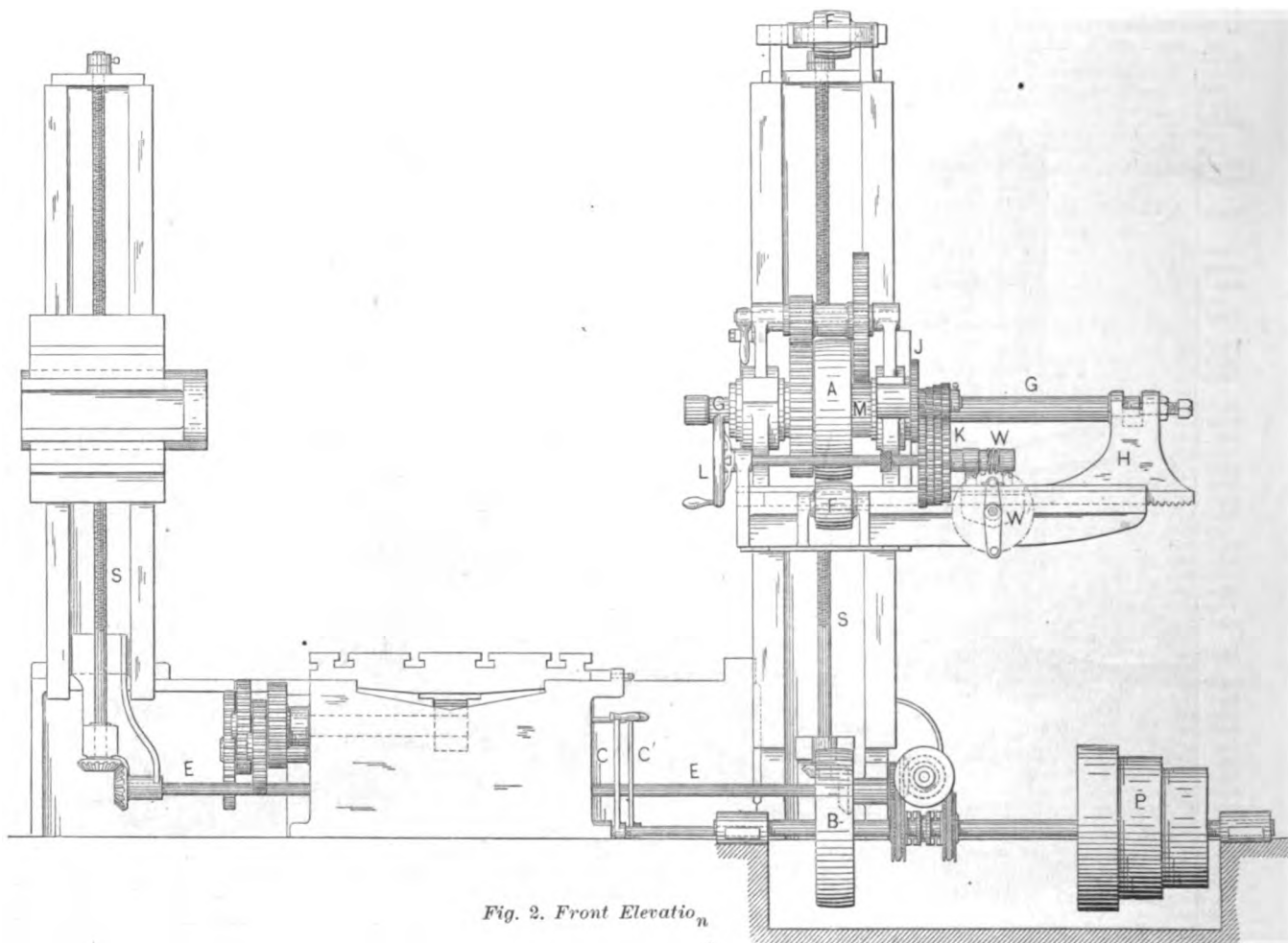
The extreme width of the tool in the clear, between head and tail blocks, is 8 feet, and its weight is 26,000 pounds

Jointing Phosphor-Bronze Wires Without Heat.

One of the greatest difficulties in connection with the use of phosphor-bronze wire, or indeed of any wire of copper alloy

would of course be still greater with phosphor-bronze wires, owing to the greater affinity of tin and copper. The best substitute for solder is a copper amalgam prepared as follows: Freshly precipitated copper oxide is heated in a tube in a stream of hydrogen until it is reduced to metallic copper. When thoroughly cooled this fine powder is moistened with dilute sulphuric acid and well mixed with mercury, and is then washed. A simpler plan, though not such a good one, is to obtain the copper powder by reducing copper sulphate by means of metallic zinc. In making use of this amalgam for jointing wires it is pressed closely round them and allowed to set. On this account a twisted joint is not very well adapted; a Britannia joint is better,

sition at Milwaukee opened at the same time, and intends to contest with the Chicago exposition for the honor of having the best display of exhibits. According to the Milwaukee newspapers the local manufacturers and business men have entered with great spirit upon the work of making a creditable showing for their city, and the exhibits are greatly praised for their variety and attractiveness. St. Louis also entered the lists on that day with its great industrial exposition, which has always won honors, and will surely not be found lagging in the rear this year. The St. Louis exposition is only one of a series of attractions gotten up every autumn by the residents of that city in order to call the attention of strangers to their business advantages and capabilities. The autumn-



NEW HORIZONTAL BORING MILL, BUILT BY THE E. W. BLISS CO., BROOKLYN, N. Y.

possessing hardness and great tensile strength, has been in the making of joints. In the ordinary manner of soldering, the heat has been found to be deleterious, and even with ordinary hard-drawn copper workmen find a difficulty in making satisfactory joints. In the "Journal of the Society of Telegraph Engineers and Electricians" an abstract is given of a foreign technical journal, which describes a method for jointing phosphor-bronze wires without any application of heat, which appears of a sufficiently interesting character to deserve the attention of our readers. The abstract states: "It is very desirable to avoid by all means the heating of phosphor-bronze wires, and, consequently, some means of jointing had to be sought for to replace the method of soldering used for iron wires. Moreover, experience has shown that some local action is set up between the tin solder and the iron wires, which in time leads to a weakening of the joint; such an action

as the amalgam penetrates inside the binding wire. But the best joint is made with a tube connection, the two ends of the wires being turned up at not too sharp an angle and secured with binding wire; the amalgam is then pressed well into the tube, where it sets quite hard. No details of this cold joint are given as to the points of strength and durability, which are highly material in judging of a successful joint."

The Interstate Industrial Exposition at Chicago was opened on the 5th inst. with much ceremony and in the presence of a very large attendance. The exhibits are unusually varied, showing that the public have not lost their interest in this annual display of the mechanical progress of the Northwest. The managers of the exposition look forward to a more successful season than ever, and they have put forth every effort to make the great building on the lake front attractive. The rival expo-

nal festivities of previous years are remembered with much pleasure by those who participated in them, and those who can will indulge in the repetition of a visit to St. Louis this season, especially when the crowning attraction, "the Veiled Prophets," present their pomp and pageantry.

Westinghouse, Church, Kerr & Co., are issuing from their Chicago office, 156 and 158 Lake street, a neat little pamphlet, descriptive of their Westinghouse automatic and junior Westinghouse automatic engines. A unique feature of the pamphlet consists in its being a "double ender." Half of the contents being devoted to each engine; they are printed the reverse of each other, so that whichever way the pamphlet is opened the first half is "right side up," while the last half is "upside down." This is done to attract the attention of the reader to both engines. The special features of the engines are compactly but very clearly stated.

Work on the Navy.

While the good work of building new vessels of war progresses, the old wooden ships are not being entirely neglected. According to the *Army and Navy Journal*, considerable work is being done at the various yards in the way of rebuilding and repairing a number of these now old but still useful craft. At the Portsmouth, N. H., yard the Kearsarge is being extensively repaired, and will be ready for her officers October 1. The estimated cost of the repairs to this ship will be \$47,792.26. At the same yard the training ships Saratoga and Portsmouth will be entirely rebuilt, at an estimated cost of \$68,000, and

greatest amount of work is being done. The Iroquois is nearly ready, and her estimated cost, when finished, will be \$29,400. She will be ready for sea September 15. The steamship Monongahela is also being overhauled and repaired at this station, at an estimated cost of \$25,000. She will be sent again to the South Pacific as store-ship of the station, with headquarters at Payta, Peru. She will be ready October 1.

The surveying steamer Ranger is being fitted for one year's service on the Pacific Coast at an outlay of \$9200, and is now ready to proceed with her work. The Mohican is now in the dry dock, and after some slight repairs are put on to enable

umn of gas extends about 15 feet above the mouth of the well, and early in the morning can be traced to the top of the derrick. The gas was struck at the depth of 1600 feet. J. Willison, of Warren, Pa., is the lessee, and it is understood that he is negotiating for its sale.

A High Bridge.—The Keystone Bridge Company, of Pittsburgh, have received a contract to erect at St. Paul, Minn., a bridge which, it is said, will be one of the highest in the world. It will extend from the end of the bridge, spanning the Mississippi River at St. Paul, across a flat to the top of a high bluff. There will be

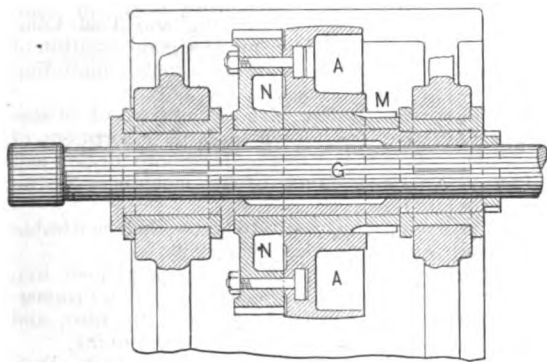


Fig. 4.—Section of Back Gear.

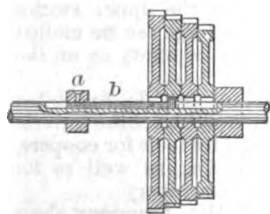


Fig. 5.—Section of Feed Gears.

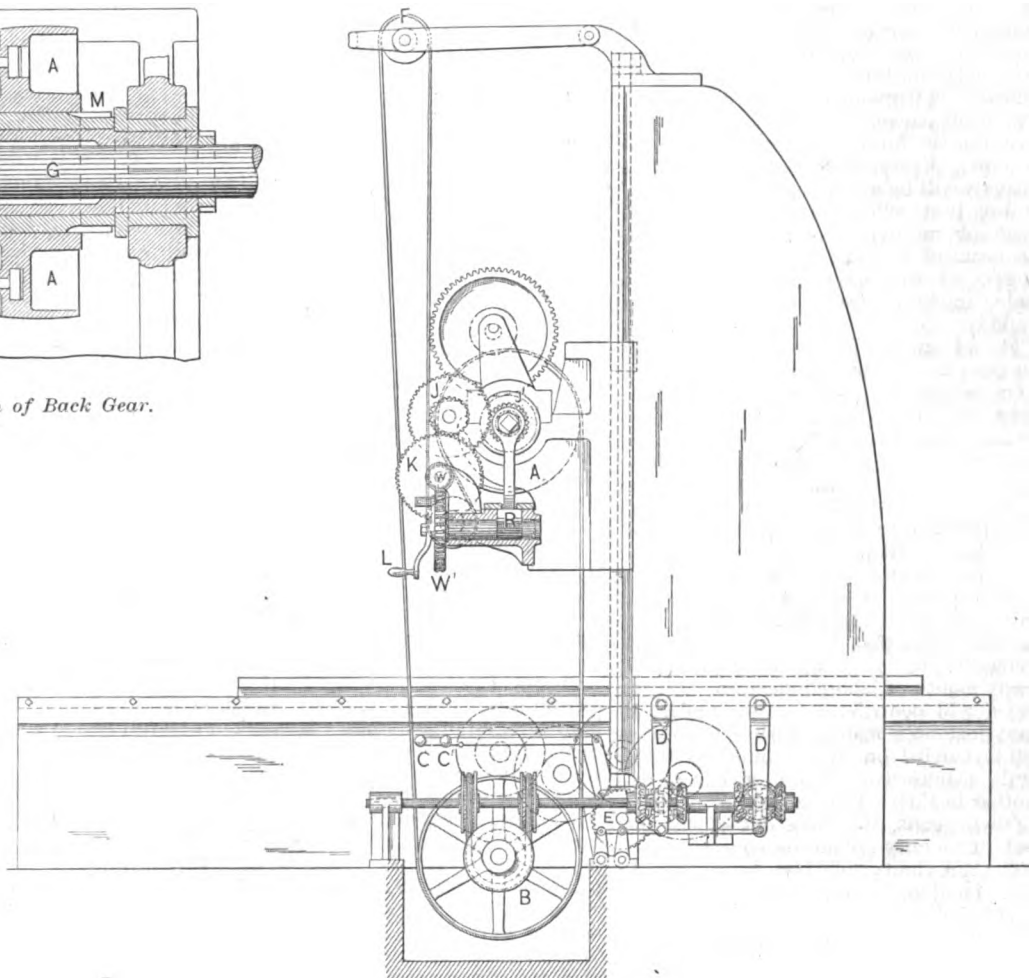


Fig. 3.—Side Elevation.

NEW HORIZONTAL BORING MILL, BUILT BY THE E. W. BLISS CO., BROOKLYN, N. Y.

will be ready about the first of the year. At the New York yard the Richmond is fitting out, ultimately to be the flagship of the Asiatic station, and will cost, when completed, \$20,596.94. She will be ready for sea in about two months from the present time.

At the Norfolk yard the Pensacola, which will be the flagship of the North Atlantic squadron, is being repaired, and the estimated cost to complete her entire is \$27,311. She will be ready in about five months. This ship will receive an entire new set of boilers, which are now being forwarded from the Washington Navy Yard, where they have been in store for some time. The double-turreted monitor Puritan will shortly be sent to the yard to be rebuilt, in accordance with an act of Congress approved August 3, 1886. The training ship Jamestown will also be repaired at this yard, at an estimated cost of \$12,000, and be ready in about three months. At the Mare Island yard the

ship to leave the dock, she will be repaired at an estimated cost of \$14,800, and be ready in 60 days. The Vandalia and Adams, of the Pacific squadron, are now on their way to the Mare Island yard for repairs, and it is expected both ships will be there by the middle of October. The double-turreted monitor Monadnock is being rebuilt also at the California yard, at an estimated cost of \$600,000, and will be ready in about two years.

A Large Natural Gas Well.—What is claimed to be the largest natural gas well in Allegheny County was struck a few days since on the farm of John M. Allison, in Richland township, and just about a mile southeast of Bakerstown. It is said to be fully equal to the McGugan well in Washington County, or the largest of the Murraysville wells. It has not yet been lighted or piped, and its roaring can be heard for eight or ten miles. A blue col-

about 20 spans, four of which will be 250 feet each in length, one about 170 feet, and the remainder from 40 to 90 feet. The ends of the spans will be supported on trestle bents, some of them being 150 feet in height. The bridge is to be of iron and steel, and the work will be especially heavy, as some of the pieces weigh many tons. The above firm have also received the contract for erecting the new Polk street viaduct and approach in Chicago. This structure will also be of iron and steel, and will be rather ornamental in design.

The Tudor Iron Works, of St. Louis, have issued a handsome catalogue of their manufactures, including rail joints, spikes, track bolts, square and hexagon nuts, two and four-bolt joints, light tee-rails, tram-rails, screw-bars, drift-bolts, bridge bolts, switches and frogs. A few useful tables, and a cipher for ordering goods are added.

The Buffalo Fair.

Too much cannot be said in praise of Cicero I. Hamblin and the men associated with him who have brought about the formation of the Buffalo International Fair Association. From the start they have given their money, time and skill to further its interests. They are about to reap the harvest of their unselfish labor, for the success of the fair is now assured.

The fair building is one of the finest for the purpose ever put up, and is alike creditable to Marling & Burdette, architects, and to the association. Not a dark corner is to be found in the entire building. All space is equally advantageous for the display of exhibits. The galleries from which the main floor can be viewed are wide enough to accommodate any reasonable number of visitors. Evidently the projectors have faith in their venture, for it is intended as a permanent affair, and, under their management, is likely to be as prosperous in the future as it gives promise to be now. Every facility for transacting business will be given on the grounds, including post office, railroad ticket office, telegraph and express office. Every possible means of transportation, both for passengers as well as exhibits, have been made, tracks having been laid up to the grounds.

The advantages to manufacturers resulting from a participation in this fair have been recognized. Judging from the interest shown by manufacturers in neighboring and distant States, and by the reduced railroad rates to and from Buffalo, there will be several million of visitors in the city from September 4th to 14th. It has been planned to have everything go off with vim and snap so that as much will be accomplished in two weeks at this fair as is usually done at others in one month. Enterprise is contagious, and all exhibitors will realize that a rush at once is much preferable to a long drawn-out and sleepy month of labored pleasure. All the trades will contribute to the exhibit, in many instances manufacturing operations will be carried on in the building. The local manufacturers are rivaling one another in their efforts to gain recognition for their goods, and those out of the immediate vicinity are no less concerned.

The proximity of Hamilton, Toronto and London, Ont., enables Canadian manufacturers to exhibit. This will naturally draw on thousands of Canadians. The largeness with which all arrangements are being made impresses itself on one. The *Buffalo Express*, one of the enterprising papers of this part of the country has taken 3000 square feet of space to show the entire process of making a newspaper, of which two editions will be published in the building daily. The minutest operations will be performed in full view of all who care to interest themselves in the mysteries of a daily paper.

The Machinery Exhibits.

Messrs. E. Hampson & Co., of Cortlandt street, New York, show their Eclipse Corliss engine, and are running one-half of Machinery Hall with it.

The John T. Noye Mfg. Company, Buffalo, show their Rice Automatic high speed engine. The 100 horse-power engine running one-half the machinery occupies a floor space of 6 feet in width, and 16 feet in length. If you do not look directly at its 200 revolutions per minute you would not become aware that it was in motion, for no sound of jar or steam reaches the ear so perfectly does it control itself. It is a finished piece of modern engine building, and is attracting well-merited attention from all who enter the building.

The Erie City Iron Works exhibit their Automatic high-speed engine. Among

gas engines the Otto and Baldwin are struggling for the supremacy. The latter is doing very effective work running the United States Company's dynamo, which furnishes light for the immediate vicinity. The Otto engine is in the same well-known form with a few new features. Users of small power are showing great interest in both these engines.

The manifold application of electricity in an almost unlimited number of ways is proved by what is shown here. The Electric Service Company, of Buffalo, have an exhibit of the Johnson Temperature Regulator. This combination of electricity and compressed air, described in *The Iron Age* some time ago, is automatic in operation, and secures an absolutely even degree of temperature wherever applied. It is now in successful operation in dwellings, office buildings, schools, libraries, &c., and proves its value daily during the trying winter weather of this latitude.

Another electrical device shown is the Electrical Accumulator, in the exhibit of the Electro-Dynamic Company, of Philadelphia. By the use of this simple invention electricity for lighting and power purposes may be stored up and held on tap, so to speak. In many factories and even in large central lighting plants these batteries have done good service. They may be charged during the day while the machinery is running, and in use at night for lighting when the power is shut off.

The Electric Power Controller Company, of 34 Dey street, New York, show an automatic device, by the use of which power pumps and all moving machinery can be controlled from a distance. The simple device is arranged to trip valves and levers, whereby machinery may be stopped in case of an accident by pushing the common electric button. The value of this invention will be appreciated by all mill owners, where many operatives are employed about the machinery, and where the liability to accident is great.

Messrs. Pratt & Letchworth, of Buffalo, exhibit a full line of saddlery and coach hardware, all of which has been taken directly from their stock. Their extensive works are located at Black Rock, from where they supply the market with buckles, trimmings, hames and carriage irons in all forms. A pair of hames, weighing 200 pounds, are shown, but no definite information could be obtained as to the kind of animal they were made for. The specimens of gray and malleable iron are very fine in finish, the latter showing a remarkable toughness, some specimens having been twisted and beaten into shapes that would be a test for lead. The brass, bronze, nickel and silver plating shown is beautiful. There are pieces of steel castings made by this firm varying in weight from half an ounce to 3462 pounds. Their capacity for heavy steel castings is 5 tons. All work shown is made in their own works, even the paper boxes in which some of the smaller pieces are packed.

The Buffalo Scale Company, of Buffalo, have a very creditable display of scales. Among the new things they show is a latch attachment, which obviates the weighing of the scoop on grocers' scales. Their oil scale is also a novelty. A cheese factory scale is shown, having seven beams. An immense can is placed on the platform, and as the milk is poured into this can the first beam weighs it, and so on until seven separate weighings have been made for as many different farmers. A suspension butchers' scale is shown, and also a scale for weighing and measuring the height of an ambitious lean man and the hopeful fat man. Their patent testing machine for iron tests the strength of 1 inch iron bars. It registers the elastic limit and breaking strain.

The Burdick bolt forging machine, made by Plumb, Burdick & Barnard, of Buffalo,

is a new bolt-heading machine, especially adapted to head square and hexagonal bolts, but equally suitable for special shapes. The machine will turn out from 2000 to 6000 bolts in ten hours, and prevent the bolt from being smaller under the head, where the clamps hold it in ordinary machines. The machines are quickly adjusted, require little power and can head bolts of any length.

H. W. Dopp & Son, Buffalo, show butcher and soap-makers' machinery.

In the exhibit of Gerhard Lang, of lager beer brewing fame, is the Goulding bottle washer. This little machine washes 60 dozen bottles an hour, or about as fast as a man can handle them. It looks as if the days of washing bottles with shot were past. Yawman & Erbe, of Rochester, are the makers of the machine.

The Niagara Stamping and Tool Company, of Buffalo, make a good exhibit of sheet-metal workers' tools, including presses, shears, &c.

The Dodge Mfg. Company, of Mishawaka, Ind., show a large assortment of sectional wooden pulleys, both for belt and friction. Much of the machinery is run by them.

Wurtz & Schmahel show their malleable iron frame elevator buckets.

David Bell, of Buffalo, a pioneer iron boat builder in that section, shows numerous models of boats built by him, and three steam hammers of novel build.

The Star Machine Company exhibit their blowers.

John E. Smith & Co., of Buffalo, show meat chopping machinery of an improved pattern.

Maischloss Bros. make a fine display of files and their file cutting machines.

Felthousen & Sherwood show injectors, ejectors and engineers' supplies.

The Cutler Mfg. Company, of Rochester, show their mailing system for large buildings, whereby letters in the upper stories of our large office buildings can be mailed with as much ease and certainty as on the ground floor.

L. & I. J. White, of Buffalo, exhibit a full line of edge tools and machine knives. Their assortment includes tools for coopers, carpenters, butchers, &c., as well as for molding and planing machinery.

The Buffalo Lock Mfg. Company show a large line of locks, hinges and door fittings.

The Buffalo Belting Works have in use on the two 100 horse-power engines their belts as well as on the engines running the dynamos of the Brush and Thompson-Houston companies. These belts are made practically endless and so secure a good bearing surface at all points when in contact with wheel. They are made in any width up to 30 inches and can be made larger if required. The company also make washers from strips of leather at the rate of 60,000 per day.

Hodge, Howell & Co., of Buffalo, exhibit their Cockle machine, which is much liked by millers throughout the country. Frank & Co., Buffalo, exhibit wood-working machinery. The most marked piece is a combination hand and jig saw.

Bradley & Co., of Syracuse, show some fine cushioned trip hammers. They are fine specimens of mechanical skill.

The Springfield Glue and Emery Wheel Company show a full line of their grinding machinery, including their automatic knife grinder.

The Shepherd Hardware Company, of Buffalo, show their lightning ice-cream freezer Queen City, fruit and wine presses, toy bank and a large assortment of builders' hardware.

Messrs. John C. Jewitt & Co., exhibit their refrigerators, water coolers and a large line of metal goods in plain brass and plated. All show a high appreciation of what is novel and artistic in coal-hods, bird-cages, teapots, cuspadores, &c.

Danforth & Clark show a fine line of gas appliances in ranges, water heaters, &c. Their line of steam and hot-water heating apparatus is also well represented.

The bicycle exhibit is very large, possibly owing to the races in connection with the fair.

Mr. Read & Son, of Boston, show their specialty, the New Mail. Mr. Will S. Atwell has the exhibit in charge. The special features they call attention to are the Trigwell ball head and the Warwick perfection backbone and rim, all of which have now a well-deserved reputation among wheelmen.

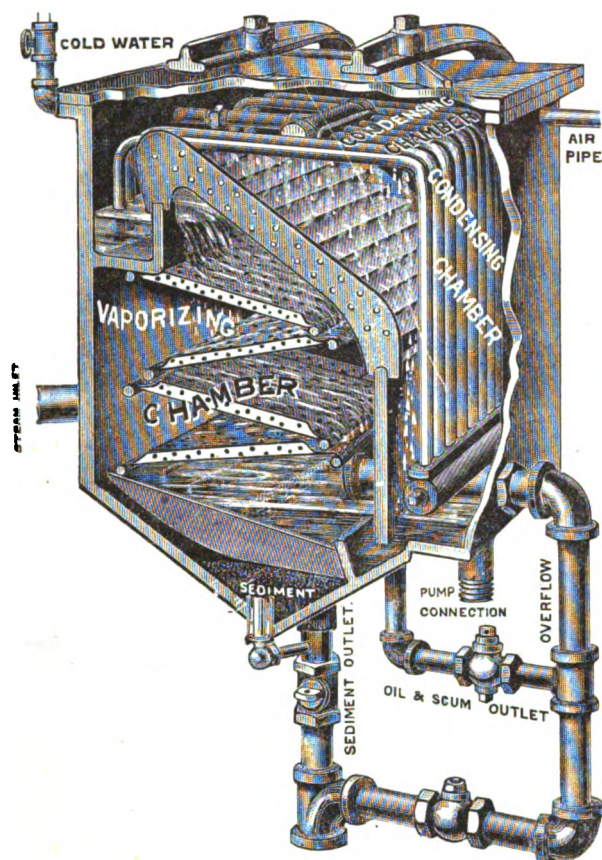
The Overman Wheel Company are the makers of the Victor bicycle; they call attention to their Safety with latest improvements. Owing to the small diameter of wheels the vibration is great. To overcome this they have introduced a spring

to the needs of the day. The entire cycle exhibit is fine, showing, at a glance, a high order of mechanical perfection and taste.

Hodge, Howell & Co., exhibit their Unrivaled elevator head and boot, and combined head and hanger.

The Buffalo Belting Works, in addition to their patent web belting used on nearly all the running machinery, have a fine exhibit of leather belting. The graphophone also is exhibited and attracts a large number of visitors.

The Buffalo Express has an immense establishment in full operation, showing every detail of newspaper work, from editing to selling a paper, including telegraphic reports. They print the *Lightning Express* on a Scott perfection press. This is more than enterprising, and may prove to be the establishment of a new evening paper in Buffalo.



FEED WATER HEATER, MADE BY MESSRS. WARREN WEBSTER & CO., PHILADELPHIA, PA.

fork which absorbs the vibration, and, so to speak, carries with it its own good road. One foreign manufacture of bicycles has an exhibit here in the Club of the Coventry Machinists Company, of Coventry, England.

The Springfield Roadster is also to be seen. This machine is known as one possessing good qualities as a hill climber and coaster. The use of the lever in place of the crank makes long distance riding a pleasure.

Messrs. W. B. Everett & Co., of Boston, show the Singer cycles in all patterns.

The most extensive and varied exhibit is that of the Pope Mfg. Company, of Boston, which includes bicycles, tricycles, &c., too numerous to mention. Among the curiosities is a bicycle made by a Pennsylvania boy, and used to ride hundreds of miles. The wheels are made of solid wood with a flat hoop iron tire. It is quite a clumsy affair, though it appears to have done good service. Next in interest is the oldest bicycle in existence. It shows by contrast what a vast improvement has been made in the adaptation of the bicycle

Mr. Charles M. Morse, superintendent of machinery, has worked night and day to get the machinery hall in running shape, and to his efforts are due the promptness with which every piece of machinery started at 10 a.m., September 4.

The preparations for building the armored cruiser Maine at the New York Navy Yard are well advanced, and work will be begun as soon as a good supply of material is delivered. The Maine is the heaviest of the vessels yet authorized for the new navy, and differs from the earlier cruisers, like the Atlanta, the Boston, the Charleston and the Baltimore, in carrying heavy armor.

On Thursday, the 6th inst., the Pittsburgh and Lake Erie Railroad made a reduction in the rates on iron and steel billets and blooms, in carloads of 24,000 pounds or over, from Pittsburgh, Chartiers, Phillipsburg, Beaver, Fallston and Beaver Falls to Cleveland, Ohio, to \$1.25 per gross ton.

The Webster Feed Water Heater and Purifier.

What is known as the Vacuum feed water heater and purifier is being put on the market by Messrs. Warren Webster & Co., 491 North Third street, Philadelphia, Pa. The engraving which we annex explains its construction and operation.

The apparatus consists of a casing comprising an outer vessel or shell, in which are located a vaporizing or purifying chamber, a condensing chamber, a sediment chamber or receptacle, a delivery-pipe communicating with the vaporizing or purifying chamber and condensing chamber, water, steam, air and over-flow pipes, as shown in cut. The sediment chamber is provided with discharge-pipes and with suitable stop-cock and check-valve. The purifying chamber is supplied with steam through a pipe communicating with the exhaust of the engine or other steam supply and is also provided with an overflow-pipe leading to the drain-pipe of the sediment chamber.

The pump connection represents the delivery-pipe, which leads from the condensing chamber to the pump. The purifying chamber is formed by means of the front partitions extending entirely across the chamber and down into the sediment well. In this chamber are located a series of perforated trays or plates, and the highest plates communicates with the distributing device. In the sediment chamber are arranged a series of inclined plates; these plates are inclined in order to insure a perfect precipitation of sediment, and also to prevent any agitation of the same. The cold water inlet-pipe is for supplying water to the "purifier" and is provided with a cock or valve, and this pipe enters the condensing chamber at the top of the casing and supplies the water through the pipes in the condensing chamber to the distributing device. Above the purifying chamber and below the pipes in the condensing chamber are arranged a series of plates or steps, forming an inclined passage to allow vapors to pass freely from the vaporizing chamber, but to prevent the condensed vapors from returning into the former. An air outlet is provided, by means of which the air, liberated from the water, is withdrawn and prevented from accumulating in the condensing chamber. A branch pipe leads from the discharge-pipe and a water gauge communicates with the latter, showing the amount of water in the purifying chamber. All the inside parts are readily accessible.

It will be understood that action of the apparatus consists in converting the water to be purified into vapors, and re-converting the vapors back into a liquid state by the water next entering to be purified. The water is supplied to the purifying chamber, in which it is subjected to the action of heat, which removes the impurities from the water and causing them to fall into the sediment well, the heated vapors rising, enter the condensing chamber, and the moment they come in contact with the condensing surface the heat in the vapors is extracted and imparted to the entering volume of water before it enters the vaporizing chamber, and the vapors then drop in the form of liquid.

The grease and light impurities are prevented from passing out with the pure water by the partition wall extending below the level of the delivery-pipe, which entirely prevents them from entering the pump. The discharge or grease and scum-pipe leads from the bottom of the inclined plate nearest the delivery-pipe and is especially adapted for removing grease or scum which may accumulate by simply opening the cock. In case too great an amount of water should accumulate in the purifying chamber it will pass out through the overflow-pipe to the discharge-pipe.

Captain Jones on American Bridge Steel.

As the *Ironmonger* puts it, the "cat was let out of the bag" by Captain W. R. Jones, of the Edgar Thomson and Homestead Steel Works, at the meeting of the Iron and Steel Institute. Mr. Jones is reported by our contemporary to have said:

A word in regard to the steel used in the United States. Their boiler-makers and their bridge constructors lacked one point in their starting out. He said: "Give your chemical specifications; start out with a decided chemical composition in your steel, then all persons who bid on the steel bid on equal terms." Where the physical properties were alone specified, each maker (and there were a great many of them in America) would put in the cheapest kind of steel that would possibly reach that specification. The general result was that steel largely entered into the construction of bridges in the United States that had no business to be there. For the boilers alone of the Edgar Thomson Steel Works, their specifications were far more rigid than that of the United States Government for boilers for their cruisers. The Edgar Thomson specifications limited the phosphorus to 0.035, and the manganese to 0.035. When those specifications were first given out, the steel-makers refused to conform to them, but he insisted, and that was the character of the work. He specified that no holes were to be punched, and that the drift was to be absolutely kept away from the work, and he sent an inspector to have it carried out. With regard to the bridge material, he knew of his own personal knowledge that there had not been the proper care taken in the manufacture of steel. He had seen steel made for bridge structures; the heat was blown very rapidly—in probably eight minutes—the ferromanganese was put in cold, and he did not think the reaction had taken place yet in that steel. (Laughter.) On assuming general charge of the Homestead Steel Works, where they had succeeded by a different practice in not making good steel, he radically changed that, and he thought that Mr. Clark would testify that the steel he received from the Homestead Steel Works in the year 1888 was certainly of a very high class. A large series of tests were made, showing that the steel was homogeneous, and was remarkable in its even results; he was sorry he had not got the results with him. He fully coincided in everything the president had said, and the meeting would notice that the heartiest applause came from that side of the house in which he sat. He would now say, in conclusion, as he had said to Mr. Clark before, at such another assembled body of wise men, that he held as a cardinal principle—and again he would say that if he had this great dictatorial power he would enforce it, and it should be enforced by law—that no member of a bridge construction should have an excess of 0.65 in phosphorus. That was the uttermost limit that he would allow. He was opposed to the excess. He would keep the manganese as low as possible, as it is a great oxidizing agent, particularly in boilers. They could readily keep under $\frac{1}{2}$ per cent. of manganese. To start with, however, the chemical properties must be specified; then all contractors bidding on this bridge steel would enter the race on even "terms." He wanted first to have the chemical composition of the steel correct; then the physical tests could follow. (Applause.)

How correct this version of the remarks of Captain Jones is we are not in a position to state. The *Ironmonger* is very enterprising in giving an early report, but at times its zeal is evidently greater than its discretion. During the same meeting it attributed to M. Gautier the following choice bit, a part of the discussion on Mr. Hadfield's paper: "They employed a very soft kind of steel, because as the head of the nail was covered by the hole, they were sure that the wear and tear of this steel was not higher than it was in the steel."

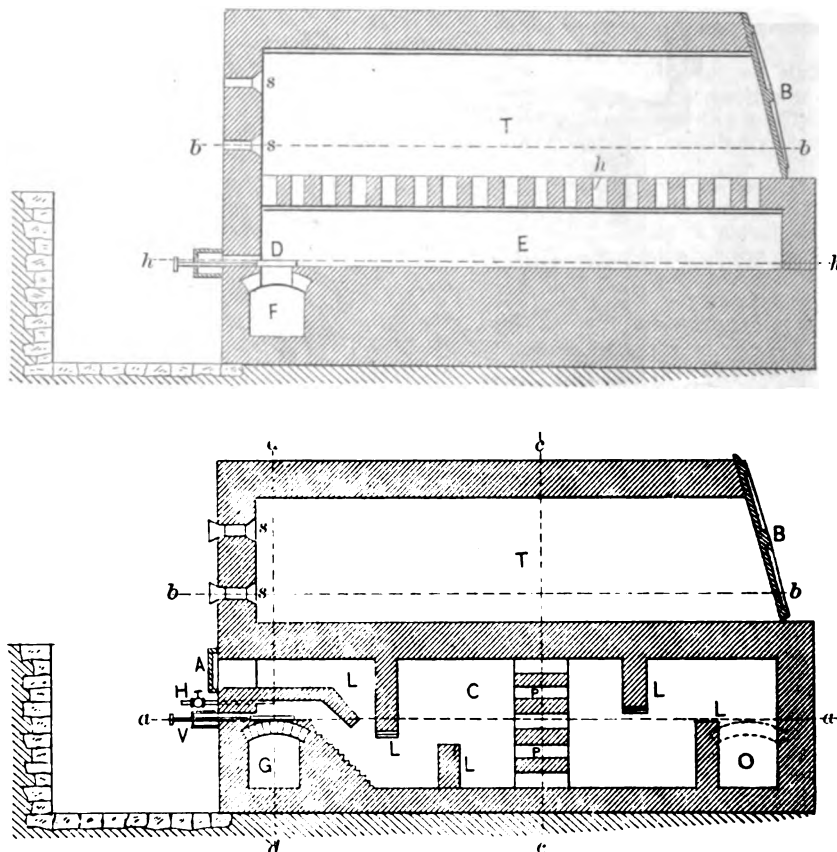
While it is possible that Mr. Jones may not have been well understood by a reporter evidently without technical training, the conclusions drawn editorially from his remarks, in a later issue of the *Ironmonger*, may prove entertaining. We quote in full:

Bessemer steel manufacturers in this country have long been astonished and puzzled by the extraordinary output of the Bessemer works of the United States. Not merely in respect of the number of blows, but also as regards the tonnage per week or month, the American mak-

ers of Bessemer steel appear to be far ahead of us—so far, indeed, that our manufacturers are very curious, not to say anxious, to know "how it is done." In Great Britain the practice pursued in producing Bessemer steel is fairly uniform, and it is generally conceded that considerable expedition characterizes the work from beginning to end. Yet, with all our skill and knowledge, we are admittedly behind the American makers to a very marked extent. They seem to get more steel in a week out of 7-ton converters than we do from 10-ton converters. A remark made at last week's meeting of the Iron and Steel Institute by Captain Jones, of the Edgar Thomson Steel Works, may, perhaps, aid in elucidating the mystery. Captain Jones said that proper care had not been taken in the manufacture of certain American steel for bridges, and he "let the cat out of the bag" by stating that the "blow" was probably performed in not more than eight minutes, and the ferromanganese put in cold. If that period represents anything like the general length of time given to the "blow" in the United States, we need wonder no longer that so many heats per shift are got out in the Besse-

Wells' Rustless Iron.

The Wells Rustless Iron Company, 21 Cliff street, New York, had for some time previous to this year been manufacturing protected ironware under the Bower-Barff patents. A year or more ago, however, they began experimenting with a new process, the invention of Mr. W. T. Wells, the president of the company, and since the first of the year they have been using the Wells process exclusively. Iron protected by magnetic oxide has become such a popular article in many lines of trade that a description of this new process will be of interest to our readers. We will describe at first the process and follow with a description of the furnace used. The charge of iron or steel articles to the amount of some 12,000 pounds weight is placed in an ordinary muffle or heating



Figs. 1 and 2.—Vertical Longitudinal Sections of Furnace.

WELLS' RUSTLESS IRON.

mer works there. A shortening of the blowing time by from 80 to 100 per cent. must mean a good deal in a week's work, and the fact goes a long way in helping us to understand the enormous outputs of the American works. It is an entirely different question as to whether the steel thus produced is what it ought to be. If Captain Jones is correctly informed—and so able a gentleman certainly is in a position to know whereof he speaks—it is obvious that a good deal of the American Bessemer material must be of very poor quality. The very short blow is likely to render that result moderately certain, but to put in the ferromanganese cold is quite sufficient to make the product anything but steel. In saying this we do not seek to attach general discredit to American Bessemer steel, but desire simply to show that where really good and well-made steel is to be turned out it is not possible to make it in substantially less time or in much larger quantities than is done by our own works. This is true of ordinary rail steel, and is necessarily even more emphatic in relation to steel containing specified percentages of carbon for purposes other than rail making.

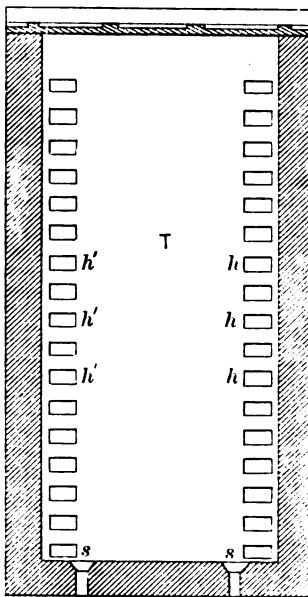
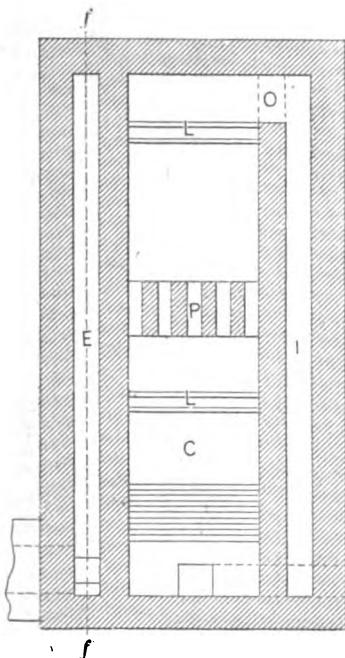
It is stated that the French cruiser *Alger* is to have triple-expansion engines worked at 240 pounds per square inch, furnished by Belleville boilers.

chamber and there gradually heated during a period of some 12 hours. It is important not to heat any part of the charge so as to blister it, and yet every part must be raised to the dull-red heat required by the process. The inventor prefers to use the gas made by the well-known Siemens' Producer in heating the charge and to admit air in limited quantities into the chamber along with the gas coming from the producers just enough to consume the latter and give a small flame in the chamber. During this operation the dampers are opened, permitting the escape of the products of combustion into the chimney. The heating must be gradual so that the charge will be raised in temperature evenly and equally and all blistering avoided. The increase of temperature should be so regulated that the maximum of heat is reached at the end of about 12 hours, though if a smaller charge than the one mentioned is used a shorter period will suffice. The surface of the charge by this gradual heating is apt to become somewhat oxidized both to red and black oxide, but the effect is irregular

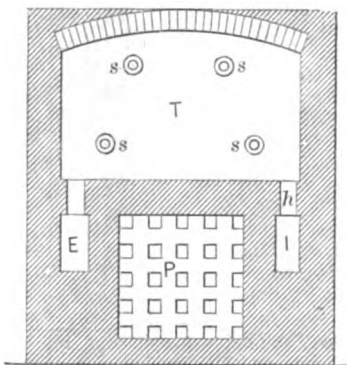
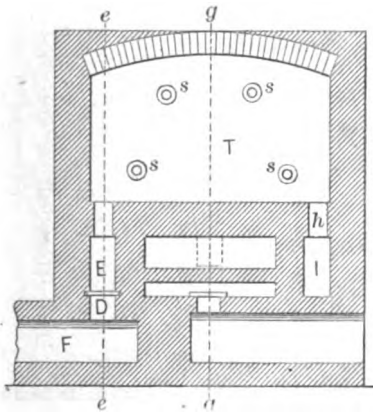
and patchy where it does appear at all, and is not of any general importance in the result. The next and final step in the process is to turn on a mixture of steam and carbonic oxide gas when the chimney damper is closed. In this atmosphere of steam and carbonic oxide the charge is left for some five hours, more or less. The heat of the charge at the beginning of the operation is a dull-red and air should be excluded as far as possible. The steam, it is said, need be under little or no pressure, and may or may not be super-heated before introducing into the

feet high, 25 feet long and 6 feet wide. Figs. 3 and 4 are horizontal sections of the furnace, while Figs. 5 and 6 are transverse vertical sections. The section in Fig. 1 is made on the line *ff* (Fig. 3), and on the line *ee* (Fig. 5). Fig. 2 is a section on the line *gg* (Fig. 5). Fig. 3 is a section on the line *hh* (Fig. 1) and on the line *aa* (Fig. 2). Fig. 5 is a section on the line *dd* of Fig. 6. Fig. 6 is a section on the line *cc* (Fig. 2). Referring now to the special parts of the furnace *V* is the gas valve; *A* (Fig. 2) is an air valve; *G* is a gas flue; *H* is a steam valve; *C* combustion chamber;

pose of combustion by opening the valve at *A*, Fig. 2, during which operation the damper *D*, Fig. 1, is opened, permitting the escape of the products of combustion to the chimney. The gas, entering through *V*, mingles with the air passing through *A* at the extremity of the curtain, and is further mixed with the air by the checker-work *P* in the combustion chamber. The burning gas, passing through *O*, enters the port chamber *I* (Figs. 3, 5, 6), from which it passes up through the portholes *h* around, through and over the charge in *T*, and thence through the portholes *h* into the escape flue *E*, to the chimney flue *F*. When the charge has been heated to a dull red, the valve *A*, Fig. 2, is closed and steam is admitted through the valve *H*, the damper *D* being closed. For five hours the charge is submitted to the action of the mingled steam and carbonic oxide gas, the air being excluded as far as possible. The magnetic oxide produced by this process is described as very hard and comparatively elastic. It stands frictional wear well, but is apt to be injured by hammer blows or rough usage. Wherever the coating is removed rust will form, but it will not burrow under and raise the adjacent coating. The works of the Wells Rustless Iron Company are situated at Little Ferry, N. J., but a short distance from Jersey City, where there are furnaces for treating all kinds of iron and steel. They describe their process as especially adapted to wrought iron pipe for water conveyance, grate frames and fenders, architectural ironwork, ship work, gas, culinary utensils, cast-iron soil pipes and plumbers' castings, &c.



Figs. 3 and 4.—Horizontal Sections of Furnace.



Figs. 5 and 6.—Transverse Vertical Sections of Furnace.

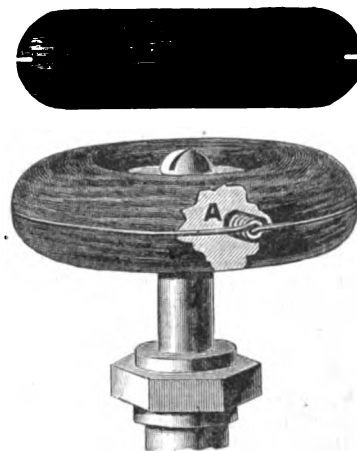
WELLS' RUSTLESS IRON.

chamber. This final step of the process is the essential one, in which is produced the desired result of black or magnetic oxide. We will now describe, with the aid of sectional views, the furnace employed, which is an ordinary muffle or heating chamber of the usual construction. It does not require any special appliances to make it absolutely air or steam tight, or capable of standing high pressure, as the Wells process, it is said, does not require such elaborate or costly apparatus. The inventor does not limit himself to the employment of any particular kind of apparatus, but following is a description of what he considers the best means for carrying out his process. Referring to the engravings, Figs. 1 and 2 are vertical longitudinal sections of the furnace, which is built of masonry, in the ordinary way, about 5

feet high, 25 feet long and 6 feet wide. *O* (Fig. 2) an opening into the port chamber *I* (Fig. 6); *h h h* (Figs. 1, 4, 5 and 6) port holes; *T* is the main heating chamber; with an escape at *E* (Fig. 3); *D* is a chimney damper (Fig. 1) and *F* in the same figure is the chimney flue; *P* (Fig. 2) is a checker work in the combustion chamber; *s s s* are sight holes in the back of heating chamber; *l l* are curtains of masonry. When the articles are to be treated for the production of a rustless oxide on their surface they are placed in the heating chamber *T*, by being drawn in upon a drag through the door *B* (Fig. 2). The charge is gradually heated up through a period of, say, 10 to 12 hours, according to the size, by means of gas from a Siemens producer, admitted through the flue *G* by opening the valve *V*. A small quantity of air is also admitted for the pur-

Wire Bound Wood Hand Wheel.

For manipulating steam valves on radiators and cylinder lubricators a non-conducting wheel is required, and, as these wheels are usually made of wood, they are very easily split and broken off by heat or from a slight blow, thus making it difficult to open or close the valves, and the latter are a constant source of trouble. To prevent this trouble and to make the wheels more durable Mr. F. Lunkenheimer, proprietor of the Cincin-



Wire Bound Wood Hand Wheel.

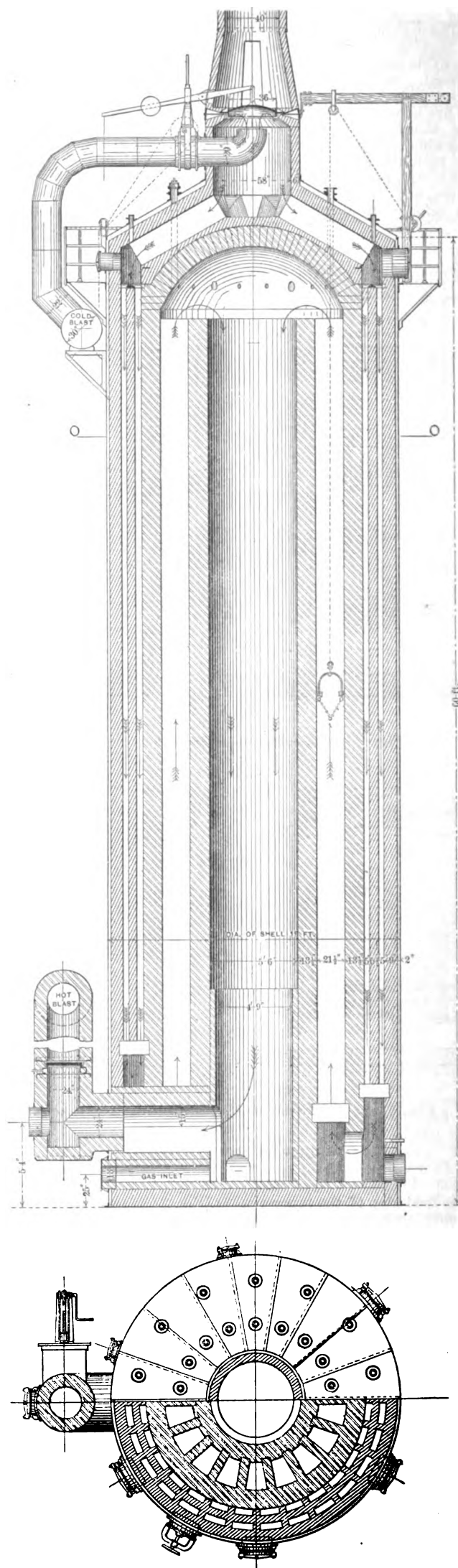
nati Brass Works, Cincinnati, Ohio, has brought out a simple and efficient binder, the nature of which will be readily understood from the annexed cut. The wheels are circumferentially grooved and a wire bidder is inserted, the ends of which are twisted and sunk in a pit, as shown at *A*. The wire, as well as the groove, may be covered with a suitable cement of the same color as the handle and thereby made invisible. The binding of handles in this way is not expensive, and, as cheaper woods can be used in handles thus bound, the extra expense is very little.

The Massick & Crooks Hot-Blast Stove.

Among the hot-blast stoves which are widely used abroad but until lately little known in this country is the Massick & Crooks which is now being introduced by McClure & Schuler, of Pittsburgh. Up to August, 1886, 60 of these stoves had been built in England and Scotland, the following works being equipped with them: Askan, 15; Blaine, 4; Seaton-Carew, 8; Carlton, 1; Millom, 8; Parton, 1; Airdeer, 6; Glengarnock, 9, and Workington, 8. In this country the first were built about ten months since for Schoenberger, Speer & Co., of Pittsburgh, and lately contracts have been closed for three stoves 16 feet 6 inches by 60 feet for the Williamson Iron Company at Birmingham, Ala., three stoves, 18 feet by 65 feet, for one of the Milwaukee furnaces of the North Chicago Rolling Mill Company, and three for the Brier Hill Iron and Coal Company, of Youngstown.

The accompanying engraving shows the construction of the stove. The shell is a wrought-iron cylinder with a cone-shaped roof. At the apex of the roof is placed a chimney to carry off the gases while the stove is being heated, thus obviating the necessity of having an underground chimney flue, and large and expensive draft chimney which occupies valuable space. The stove has a central combustion, outside of which are large segmental shaped flues which lead the gases down and into the outside flues. The latter are smaller, segmental in shape, the gases passing through them and out through the chimney. The walls are all heavy and the passes large, thus avoiding the drawback of securing a large amount of heating surface at the expense of thin walls. McClure & Schuler state that in their experience that a stove having thick walls when thoroughly heated up will retain the heat longer. This was demonstrated a short time ago. Shoenberger, Speer & Co. had a break out at the hearth of their furnace. They had the blast off the furnace for eight hours. When work was resumed they had 1200° of heat to start with. By having a central combustion chamber circular in form the greatest heat is in the center, thus equalizing the expansion. This chamber can be entirely removed and replaced without disturbing any part of the brickwork, and there are no straight or parallel walls to get out of shape from heat expansion and contraction. Where the cold blast is introduced into the stove it blows against the underside of the chimney valve, thus automatically closing it. The wind breaking its force on the valve before coming in contact with any part of the brickwork. This is considered very important by the designers, as they find the introduction of the blast in another manner cuts out the joints, weakening the walls.

For cleaning, a series of plug holes with tight-fitting caps are provided, as shown in the plan. Through these holes a small coil chain is passed to the bottom of flue; a spring scraper that neatly fits the flue is attached and the chain is wound up by a portable crane shown on elevation. An arrangement is also provided by which the flues can be blown out as desired. The stove flues being divided into six compartments, a cleaning door is used to get access into the bottom of stove. On these doors there is a fly-back relief-door, which is suddenly opened when the pressure is on the stove, causing a rapid flow of the blast toward the flues whose relief-door is open. By this means the flues are to a great extent cleaned. These doors are opened alternately when changing from blast to gas. In the case of the stoves erected at the furnace of Schoenberger, Speer & Co.,



in Pittsburgh, about ten months ago, the only cleaning ever done since starting was to remove the accumulation of dust at the bottom of the stove and that was done only once.

Schoenberger, Speer & Co. report that after eight months' use the stoves gave 1400° to 1600° of blast temperature as readily as when they were first used, and that during that time they have not noticed any weakness in any part. The following is a copy of the record of the casts, running on Bessemer metal, from August 2d to 10th:

Cast No.	Silicon.	Sulphur.
1021.....	2.32	0.002
1022.....	2.30	0.004
1023.....	2.85	0.006
1024.....	2.15	0.004
1025.....	2.31	0.002
1026.....	2.63	trace
1027.....	2.74	trace
1028.....	2.75	trace
1029.....	2.10	0.005
1030.....	2.32	0.01
1031.....	2.47	trace
1032.....	2.55	trace
1033.....	2.29	0.004
1034.....	2.65	trace
1035.....	2.01	0.01
1036.....	2.55	trace
1037.....	2.52	trace
1038.....	1.96	trace
1039.....	2.04	0.008
1040.....	2.17	trace
1041.....	2.17	trace
1042.....	2.12	trace
1043.....	2.12	0.003
1044.....	2.08	trace
1045.....	2.73	none
1046.....	2.13	0.002
1047.....	2.28	0.007
1048.....	2.25	0.003
1049.....	2.38	trace
1050.....	2.23	0.004
1051.....	2.46	0.035
1052.....	2.52	0.004
1053.....	2.25	0.003
1054.....	2.52	trace
1055.....	2.32	0.002
1056.....	1.85	0.002

The consumption of fuel to the ton of iron during that time is reported by Schoenberger, Speer & Co. to have been 2018 pounds of coke.

Pittsburgh Nail Manufacturers.—Announcement is made that Shoenberger & Co., formerly one of the largest nail-making concerns of Pittsburgh, have decided to abandon that industry and will shortly dispose of their nail machines, 92 in number. The principal reason advanced for this step is that after the usual summer stoppage for repairs and operations were about to be resumed the nailers in the employ of the firm demanded a considerable advance on the regular scale for cutting chisel-pointed nails, the manufacture of which is a specialty of the firm. This demand was refused and the nail factory has been closed down. The retirement of this firm from the nail business leaves but two concerns in Pittsburgh engaged in the manufacturing of nails. These are Jones & Laughlins, Limited, and Chess, Cook & Co., with 63 and 96 nail machines respectively. Less than five years ago there were nearly as many nails made in Pittsburgh as in Wheeling, while to-day it is probable that the smallest concern in Wheeling is making more nails than are manufactured by the two remaining works in Pittsburgh. The principal reason of this great change here is the fact that the Pittsburgh nail manufacturers have been compelled for years to pay more for nail cutting than is paid in either Wheeling or at any of the factories located in Ohio. It is a well-known fact that for months past the Wheeling manufacturers have been selling nails in Pittsburgh for less money than the Pittsburgh manufacturers can make them. For this reason the manufacturers at Pittsburgh have gradually given up the manufacture of nails, and, unless a wonderful revival in the trade should take place, the manufacture of nails at that city will soon be a thing of the past.

The Iron and Steel Institute.

Edinburgh Meeting.

The first paper read before the Iron and Steel Institute at the Edinburgh meeting, by Daniel Adamson, on a compound lever-testing machine of 15,000 powers, is not of sufficient interest to call for reproduction, especially since the accompanying drawings have not yet been published. The second contribution to the proceedings of the meeting, by R. A. Hadfield, of Sheffield, is likely to attract more general attention, since it gives additional data on

Manganese Steel.

This new steel has drawbacks that at present interfere with its usefulness and commercial introduction. The chief one met with is its hardness. The majority of articles used in machine construction of any kind must be tooled, fitted or adjusted to shape, and this is almost out of the question with this material—in fact, in its machining it may be described as equal to the hardness of chilled iron. No doubt, by experiments and perseverance, this and other difficulties will be overcome, and possibly this very drawback may eventually prove a blessing in disguise, inasmuch as should some better method of machining or finishing be perfected, it should be equally beneficial to all branches of engineering.

A series of experiments was commenced at the Hecla works, Sheffield, some few years ago, it being thought possible that steel with high manganese might give a hard material, somewhat like spiegel-eisen, but without the brittleness of the latter, seeing that the carbon should be so much reduced. After many trials a material was produced combining great strength with hardness, but the puzzling and apparently paradoxical result was discovered that, although steel, if it may be so termed, with 4 to 6 per cent. of manganese, and less than $\frac{1}{4}$ per cent. of carbon, was so brittle that it could be powdered under a hand-hammer, yet, by adding twice this amount of manganese, just the contrary effect was produced, and a material was obtained containing many apparently new properties, as compared with any iron or steel hitherto manufactured. Briefly, the material may be described as follows: That containing from $2\frac{1}{4}$ to 6 per cent. is extremely brittle in its cast state; then a return in strength gradually takes place, and, with about 9 to 10 per cent., a cast bar, $2\frac{1}{4}$ inches square, can be bent considerably out of the straight without breaking. This continues up to about 14 or 15 per cent., when a decrease occurs in actual toughness, though not in transverse strength, and after about 20 per cent. is passed, then a rapid decrease again takes place. It should be stated that these remarks apply specially to the material in its cast state.

Possibly, if ferromanganese were made with less carbon, or if pure metallic manganese could be obtained, the maximum of strength might occur with even higher manganese; but now, as the higher percentages are approached—say over 16 per cent.—the experiments become more complicated, owing to the presence of $1\frac{1}{2}$ to 2 per cent. of carbon, which must necessarily interfere with the action of the manganese. It would be interesting to note the effect of adding metallic manganese—i.e., without any carbon, but, after many attempts, the writer has been unable to obtain such a metal. Samples supplied as pure manganese were generally found to contain not more than about 90 per cent.—in fact, it seems doubtful whether the exact characteristics of the metal are really known, and probably the samples under examination, and supposed to be pure,

have been mixed with impurities. Manganese steel is not so liable to honeycombs as ordinary steel, and the addition of silicon is unnecessary. It is very fluid, and can be run into thin sections, but cools more rapidly than ordinary steel, and its contraction is decidedly greater. This latter fact explains the reason of its piping and settling so much, both in the ingots and in castings; with proper heads or runners, however, this difficulty can be obviated. It is manufactured by any of the ordinary steel-making processes, the basis—i.e., the material before the ferromanganese is added, being preferably decarbonized iron (practically pure iron, Fe), or mild steel. The ferromanganese is added in a molten state, or very highly heated. The steel is then ready for casting into ingots or other forms. It is most important that the carbon should be kept as low as possible, especially in the 14 per cent. material, where it should not exceed about 1 per cent. or the product will be inferior. For this reason the ferromanganese used should contain high percentages of manganese, such as 80 to 84 per cent., now easily procurable at as low a price as 9 shillings per ton. About 0.50 per cent. of the manganese is oxidized—that is to say, to obtain a steel with about 13 per cent., about $13\frac{1}{2}$ per cent. of manganese must be added. In other words, the following mixture gives the above analysis:

	Pounds.
Ferromanganese, 80 per cent.....	375
Very mild steel or decarbonized iron...	1,865
Total.....	2,240

This would give a ton of 13 per cent. manganese steel.

MANGANESE STEEL, $7\frac{1}{2}$ PER CENT. AND UPWARD.

A. Cast State.—After passing about 7 per cent. an increase in strength occurs, and with about 10 per cent. a $2\frac{1}{4}$ inch square bar will bend considerably before breaking, although with a comparatively low transverse strength, the latter rapidly rising as the manganese increases, but the samples with higher manganese and higher transverse strength are not so tough as this 10 to 14 per cent. material. Speaking of these latter percentages, it has been found from the commencement of the experiments with this material that, notwithstanding its toughness as ordinarily cast, an extraordinary gain in strength is obtained by methods which, in ordinary steel, would cause brittleness, water cracking and other defects. This process is termed "water-toughening," and consists in heating the article under treatment to about 1800° or 2000° F., and then plunging it into cold water. The nearer the above temperatures are approached, and the colder the water, the tougher will be the material. The writer is at present unable to say whether this treatment would be found applicable, and in the same degree beneficial, with articles of large size, but he believes that with proper apparatus and methods of cooling, such as the rapid introduction of cold water into the bath to keep down the temperature, similar benefits would result. As, however, the difficulty of tooling and machining this material has not been overcome this point has not been experimented upon. The beneficial action of the water-toughening process will be seen from the actual results and tests obtained with the different articles described in this paper. It will also be seen that this toughening applies equally to material in its cast and in its forged state, and in both cases the increase in strength may, without exaggeration, be termed most remarkable.

Take, for example, small pieces of this material in its cast state, 12 inches long, $1\frac{1}{4}$ inches wide, and $\frac{3}{4}$ inch thick. After water-toughening, notwithstanding their hardness and stiffness, such strips can be bent double cold, almost in the same way

as a piece of the mildest forged steel, the apparently contradictory qualities of hardness and toughness being here obtained. This material has been tested and found well adapted, owing to its combined hardness and toughness, for couplers as used in coupling railway rolling stock in America, where nearly all cars or wagons have a coupler, drawbar, and buffer combined in one. The writer's firm has now the sole license out of America for making the well-known Janney coupler, so largely used on leading railroads in America, and introduced into this country by Mr. A. Davis, C.E., of Westminster. The couplers tested weighed 125 pounds each, and in no place excepting at the jaws are the castings more than $\frac{1}{2}$ inch thick.

The tests were made with an ordinary drop tup, weighing 2324 pounds, sliding between steel rails, and the height could be varied from 1 to 27 feet. Each casting was placed vertically, the tup falling upon the jaws, and the permanent set being carefully measured after each blow. All the couplers except No. 1 were made at the Hadfield Steel Foundry Company's works.

No. 1. American malleable iron casting.

No. 2. Manganese steel casting (Mn., 9.37 per cent.), tested just as cast.

No. 3. Mild steel casting (carbon, 0.25 per cent.). The material of which this coupler was cast had a tensile strength of 32 tons per square inch, with an elongation of 30 per cent. on 2 inches.

Nos. 4 and 5. Water-toughened manganese steel castings with 9.75 and 14.25 per cent. Mn., respectively.

Table I gives a summary of the tests and effects produced by the total forces ex-

iron and steel, has experimented with this material and found that it bent while blue hot from 21 (lowest) up to 36 (highest) times, as against 3 to 5 for Low Moor iron, and $2\frac{1}{2}$ to 7 for very mild Siemens steel. At a blue heat, therefore, it seemed to work better than iron. The Chatillon Company, in France, are experimenting with this material in the direction of using it for armor plates and other purposes. Another noteworthy test has been made with a cast flanged pipe No. 671 (Mn., 13.5 per cent.). Notwithstanding the thinness of the walls ($\frac{3}{8}$ inch), it safely bore a pressure of 5600 pounds per square inch and did not burst until 6160 pounds had been applied.

All the foregoing examples were water-toughened specimens. Other specimens, tested in their ordinary cast state, may be mentioned, such as a cast axe which has chopped through square (cold) iron, and cast razors, which, while not equal to those of ordinary steel, have done fairly well. Still, owing to the peculiar softness noticed with this material when under compression, it is hardly suitable for tools carrying a thin cutting edge. In grinding up a manganese steel axe, Mr. C. W. Hubbard, of Pittsburgh, noticed that the material possessed a close, hard and peculiarly greasy nature, and he considered that it possessed the very essence of anti-friction. A bearing was put to work at the Hecla foundry, under a shaft $2\frac{1}{2}$ inches in diameter, carrying a load of 3 cwt., and after having been at work $2\frac{1}{2}$ years it is but slightly worn. It is estimated that the number of revolutions made by the shaft has been close upon 5,000,000. As indicating its toughness, and showing how even practical steel makers may be de-

and one which led to the commencement of these experiments, is its application as a hard material for car and other wheels, to compete with those made of chilled iron in America and elsewhere. The difficulty was at once met with that if the wheel was cast in one piece, although exceedingly tough, it is hard to the tool throughout, and it is impracticable to bore out the boss. Attempts were made to cast, in the boss, soft steel or iron bushes, but this was generally unsuccessful owing to the contraction splitting the boss when cooling. A more successful method has been that of casting the wheel in two parts, then bolting or otherwise fastening them together; or that of casting in the hard tire wrought iron or soft steel arms, on to which an ordinary soft steel boss could be afterward bored, was cast. In either of these cases the tires are readily trued or ground up, as practiced in America. Wheels of this class have been used with satisfactory results. On the Nottingham tramways a set ran over 30,000 miles under severe conditions, the gradients averaging as much as 1 in 18 for about one-half the route of the daily journey. In this case a peculiar point was noticed—viz., that whereas the cast-iron wheels are liable to slip when going down an incline the chilled brake-blocks bite much more effectively on manganese wheels, enabling the car to be stopped sooner. The Chester Tramways Company has had a set running for over two years, which up till now have run over 45,000 miles, and are not yet worn out. Wheels of this description can be tested with more than 100 blows with a heavy sledge-hammer without fracture occurring, and at the same time the tire is so hard that a chisel will not touch it. A set put to work in America has already run 200,000 miles, under heavy engines of the consolidation type, on the New York and New England Railroad. The life of ordinary chilled iron wheels does not average more than 50,000 miles.

B. Forged State.—The original gives elaborate tables of tests and analyses and diagrams, too extensive for reproduction, but the following examples will suffice to show some of the results. A steel carrying 13.75 per cent. Mn., when water-toughened, possessed a tensile strength of 65 tons per square inch, with 50.7 per cent. elongation on 8 inches. Another specimen, with 14.27 per cent. Mn., gave 69 tons and 46 per cent. In the latter case, calculating the breaking-load on the area of the bar at the moment of fracture, the load was equal to the high amount of 102 tons per square inch. Another sample gave 65.61 tons with 48.4 per cent. elongation, and was still unbroken. As before pointed out, after passing about 14 per cent. the material again loses strength. This is no doubt owing to the higher amount of carbon necessarily present. Nevertheless, it has been possible to forge specimens with 20 and even 22 per cent. manganese and over 2 per cent. carbon. Thus, while an alloy of $97\frac{1}{2}$ per cent. of iron and $2\frac{1}{2}$ of carbon is practically unforgeable, an example is here met with where an alloy of 78 per cent. of iron, 2 per cent. of carbon and the rest of manganese is quite malleable. Ingots and castings containing 14 per cent. of manganese and weighing 28 to 30 cwt. have been successfully cast and forged; these may be termed fairly large pieces.

It has been thought by eminent metallurgical authorities, if this material was not a true alloy or steel, that in large masses the manganese would concentrate or separate toward the center, such as has been found to be the case in ordinary steel ingots. The above examples, however, prove that this is not so, as wire rods No. 8 B.W.G., drawn out of blooms made from ingots about 18 inches square, were found quite uniform in their percentage of manganese, as compared with the analysis

Table 1.—Comparison of Sets Produced by the Different and Total Forces Exerted on each Casting.

Energy exerted.	Effect produced on				
	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.
	Malleable Iron.	Manganese Steel as cast, 9.37 per cent. Mn.	Special Mild Steel Casting, 0.25 per cent. Carbon.	Manganese Steel No. 488, water-toughened, 9.75 per cent. Mn.	Manganese Steel No. 489, water-toughened, 12.25 per cent. Mn.
Foot-tons.	Inch.	Inch.	Inch.	Inch.	Inch.
43.37	{ 0.90 set and broken }	0.20 set	0.35 set	0.25 set	0.15 set
96.79	{ 0.35 " and broken }	0.65 "	0.40 "	0.35 "
180.82	{ 1.05 " and broken }	0.60 "	0.50 "
236.84	{ 0.65 " not broken }	0.55 "
320.87	{ 0.65 " not broken }

erted on each casting. The effect of low temperature on these castings has been noted by Mr. Harrington, mechanical engineer of the Pittsburgh, Cincinnati and St. Louis Railroad. A light manganese knuckle, weighing about 50 pounds, belonging to a coupler head, was immersed for 30 hours in a freezing mixture of salt and ice. The casting was so cold that upon touching it the hand was "burnt." A drop tup was then allowed to fall upon it from a height of 25 feet, the only effect being a slight indentation in the casting. It may be also mentioned that the effect of higher temperature upon this steel has been noticed and that no change is observed until a temperature of about 400° F. is reached. For particulars of the foregoing temperature tests the writer is indebted to Mr. J. D. Weeks, of Pittsburgh, Pa., who has taken special interest as to this steel in America. As regards the effects of increasing temperature, Mr. Stroh-meyer, who has read an interesting paper upon a similar point as affecting ordinary

ceived in the appearance of its fractures, it may be stated that when the material was being tested at the Crescent Steel Works, Pittsburgh, the blacksmith to whom an ingot was given to break was inclined to be sarcastic as to the "scalded ingot" (Mn. 10.89 per cent.), as it was termed, and said that it would be easily broken with a sledge hammer. Not only was he unable to do this, but ten blows from the steam hammer were required to cause a fracture. A singular point about the fractured appearance of the 9 per cent. material may also be mentioned. When water-toughened, though the metal is greatly increased in strength, this is certainly not owing to structural changes, as the pronounced form of crystallization of the ingot or casting is not to the eye in any way altered. It will, therefore, be understood how difficult it is to offer any satisfactory explanation of the gain in strength by this treatment, which, in all ordinary steel, would be so detrimental. Another important use of this material,

of the original ingots, thus proving that this manganese steel is a true and stable compound or alloy. Care must be taken not to overheat the ingots, or they burst and crack under the hammer. With proper care, however, there is not much trouble beyond that the steel works hard, or similarly to tool steel containing, say, 1½ to 1¾ per cent. carbon. As in lower percentage, so in this, the peculiar crystallization noted entirely disappears after forging, and a close grained metal is obtained. The bars, as received from the forge, are comparatively brittle, but reheating to a yellow heat, and cooling in air, increases the ductility five or six times. It is, however, specially with the water-toughening process, as already mentioned, that the extraordinary toughness, which is the special characteristic of this steel, is noticed. Oil has a beneficial effect, but not equal to that of either water or sulphuric acid, this, no doubt, being owing to its slower conductivity. The operation of merely heating the forged test-bar to yellow heat and cooling it in air has a very beneficial effect, the elongation in most cases showing a considerable increase, and the tensile strength, also rising 8 or 10 tons per square inch. It is somewhat curious to notice the remarkable rise both in tenacity and elongation in the 14 per cent., as compared with the 10 per cent. material. Why should the extra 4 per cent. manganese cause such a remarkable difference? The writer thought that possibly this 14 per cent. material might owe its increased tensile strength to the higher carbon present, but an experiment proved that this was not so, as a 10½ per cent. sample, with similar carbon to the 14 per cent., gave no higher tensile strength and its elongation was decidedly less.

The following tests were made to compare the forged and water-toughened manganese steel, carrying Mn. 12.55 per cent., with the best quality of steel as used in railway axles. The tup was the same as that used for the coupler tests, the axle being reversed after each blow; bearings 3 feet apart; weight of tup, 20½ cwt. The bars were 4½ inches diameter and 4 feet 6 inches long. The results of these tests show that on the manganese steel bar or axle an energy of 498 foot-tons only produced total deflections of 39 inches (i. e., the sum of all the deflections), whereas in the special steel axle an energy of 48 foot-tons produced total deflections of 105½ inches.

Table II.—Comparison of Deflections Produced on each Axle.

Effect produced by the number of blows as under.	Energy developed in foot-tons.	Sum of permanent deflections or bends in inches produced on	
		No. 1 Special steel axle.	No. 2 Manganese steel axle.
At the 5th.	79.883	24.953	8.501
At the 10th.	208.531	66.188	19.403
At the 15th.	348.561	105.248	30.212
At the 20th.	497.988	and broken	39.491 and broken

The peculiarly combined toughness, hardness and stiffness of the forged manganese steel are very clearly brought out in these tests. The material, therefore, seems specially adapted to resist severe stress before fracture, and yet, at the same time, to show very slight alteration under stress.

Peculiar Hardness.—It is somewhat difficult to describe this quality, because all the specimens are exceedingly hard—in fact, it is scarcely possible to machine any of them on a practical scale. Yet such hardness varies considerably in degree, being most intense in the cast material containing 5 to 6 per cent. of manganese, which no tool will face or touch. A slight decrease then occurs, and the 10 per cent.

material gives comparatively the softest condition. Upon a further addition of manganese an increase again takes place, and at 22 per cent. it is very hard, though still not so much so as in the 5 per cent. material. An example may be given of the forged test-bar with (Mn. 14 per cent.) which elongated 44½ per cent. without fracture, and sustained a tensile load of 67 tons per square inch. This was put under a double-gear 18-inch drill, and more than an hour was occupied in drilling one hole ¼ inch diameter by ¾ inch deep. Even to do this, it was requisite to run at the slowest possible speed, or the edge of the drill would have given way. Yet this specimen could be indented by a hammer, so that, while so hard, it may be said to possess a special kind of softness. This softness, if it may be so termed, is noticeable when testing the material for compression. Specimens of 10 per cent. manganese steel, 1 inch long by 0.79 inch diameter, although requiring several days' preparation in the lathe, owing to their hardness, yet, under a compression load of 100 tons per square inch, shortened 0.25 inch, and the harder kind (15 to 20 per cent. Mn.) 0.1 to 0.13 inch. Ordinary mild steel would shorten 0.5 inch under the same load, but chilled iron or hardened steel would stand this test without any alteration. It is difficult to explain the cause of this peculiar hardness, because manganese, when added to copper, does not produce this remarkable change, and why, therefore, should manganese added to iron, which in its pure state is but little harder than copper, produce such a hard alloy?

MANGANESE STEEL IN FRANCE.

M. Gautier, in the discussion of the paper, referred to experiments being carried on at the Chatillon et Commeny works, in France, where castings up to 4 and 5 tons in weight have been made. They began with horseshoes, using steel with ½2 per cent. of manganese; but there was this difficulty. Nails were used with horseshoes, and it was necessary when they projected from the foot of the horse to cut or file them, but if they were made of the same material it was difficult to find a tool that would cut or file them. That led to the use of another kind of material for the nails. An experiment was now being made on a large scale with some cavalry regiments in France. Considerable success had also been obtained in making cast wheels for small mining cars. The difficulty was in drawing the pieces quickly enough from the mold and putting them in water to get the proper temperature. If they were not taken out quickly enough some shrinkage would take place. The most interesting application of the metal was, perhaps, in the direction of armor plating. That, of course, was a difficult matter, because artillery experiments could not be carried out on a reduced scale. Some difficulty also had been experienced from the manganese steel being too high in carbon, and some cracking had taken place in dipping the armor plates in water, but they hoped soon to be able to make a better quality of steel with a reduced amount of carbon. He had explained at a meeting of the Institution of Civil Engineers his views on the influence of carbon on general metallurgy. The cast steel was made with carbon. The Sheffield school, making first-class steel with carbon, might be said to represent the golden age of carbon; but new processes like the Bessemer and the Siemens-Martin had induced persons in enlarging the area of manufacture to try the influence of certain impurities. Carbon appeared to be a very bad companion, and as he had shown in a paper in 1876, phosphorus might remain in steel without much trouble if there was no carbon at all. The same fact had been observed with regard to silicon, and it was now also

observed with reference to manganese. The less carbon there was in manganese steel the better it would certainly be. But it was impossible to make manganese steel with, say, 12 per cent. of manganese without having a very high amount of carbon also. Some experiments were now being made with ferromanganese to reduce the percentage of carbon, and they would show whether such a result was practicable.

Louisville Fall Celebration.

The City of Louisville, Ky., was given up to the great Industrial Parade on the 5th inst. Business being entirely suspended, the street cars stopped and the thoroughfares, which were profusely decorated, were literally crowded with visitors and sightseers. The Fall Celebration was handsomely inaugurated, and for the rest of the month festivities and attractions of various kinds will be carried on. The railroads entering Louisville are aiding materially in crowding the city with strangers by giving reduced rates of fare. The parade was one hour and a half in passing a given point, and was headed by Gov. S. B. Buckner and staff and a committee of the Commercial Club. Following came the entire Louisville Fire Department, of which the city is justly proud. Among the attractive floats were displays by the following firms known to the readers of *The Iron Age*: B. T. Avery & Sons had four floats of plows and cultivators, all beautifully finished; on the top of one wagon was a mammoth 40-horse plow. The Southwestern Agricultural Works showed their grain drills, cider presses, corn shellers and feed cutters, and interspersed with the farm implements. Fulton, Conway & Co., showed the products of their hub and spoke factory, having a large wheel 16 feet in diameter, revolving among other wheels. W. B. Belknap & Co., made a very handsome display of their hardware specialties and tools. W. T. Pyne exhibited an engine and corn mill in operation. Stratton & Terstegge and the Bridgeford Company displayed stoves and ranges of all kinds. The Fischer Leaf Company had out enough mantels to furnish several houses. The lumber display was well managed. The Fall Celebration is due entirely to the efforts of the Commercial Club, an organization just one year old, composed of young men, and numbering 687 active members. The result of the Commercial Club has been the infusion of new life to general business and enterprises through the State, of the opening up the mineral and timber lands of Eastern Kentucky, and bringing to the city 45 new manufacturing enterprises, among them some very important ones, such as the Louisville Cotton Mills Company, the Astoria Vencer and Lumber Company, the Gaynor Electric Company, the S. Western Mfg. Company and a number of others.

Johnstown Freight Rates.—The Pennsylvania Railroad Company and the Baltimore and Ohio Railroad Company have restored the old rates on iron and steel from Johnstown, Uniontown, Mount Pleasant, Scottdale and Everson, which are about 10 per cent. higher than those from Pittsburgh to Western points. Some time ago the rates from these points were reduced to the same basis as those from Pittsburgh, but the opposition manifested by the manufacturers of that city was so great that in justice to them the railroad companies restored them. Under the tariff now in force the Pittsburgh manufacturers are not discriminated against in any way.

The Cleveland police authorities have decided to permit no more red flags in that city.

THE WEEK.

Joseph Pool is at the head of an English and American syndicate which proposes to build a railroad across Mexico from Gulf to Ocean, and claims to have obtained a subsidy from the Mexican Government for the purpose. The western terminus, it is declared, will be Tonala, on the Pacific, and the Eastern, San Juan Vautista, on the River Griyalva, about 100 miles from the Gulf. This river is very deep, and will receive vessels drawing 25 feet of water as far inland as the proposed railroad terminus. The length of the road would be 225 miles, and by this line the route to New York would be 800 miles shorter than by the Isthmus of Panama. The necessary capital, it is said, has been obtained, and President Diaz, of Mexico, is said to be actively interested in the scheme. This is the second transcontinental project recently set on foot in Mexico.

The United States Superintendent of Repairs in this city reports to the Supervising Architect of the Treasury Department approving the suggestion first put forth by the New York Produce Exchange that the property bounded by Bowling Green, Whitehall and State streets be bought as a site for the new Appraiser's stores and Custom House. He calculates that \$3,000,000 would be a fair valuation for the land thus taken.

The situation in the petroleum markets at this time is more interesting than it has been for several years. There are indications of a combination of big operators to put up the price of crude oil, and the movement of the market in the past few days is taken as evidence that the combine, if there is one, is not without its influence. The big shut-down movement of the Producers' Protective Association expires on the 1st of November, and by that time the stocks will have been reduced from 31,000,000 to 20,000,000 barrels. Besides reducing stocks the work of the Producers' Association has lowered the daily output of the wells from 72,000 barrels to 38,000. It is now proposed to pool the oil and sell it through a committee of trustees, who will also regulate production and restrict the drilling limits.

The transportation lines of steamers on the northern lakes, although reinforced by a large addition of tonnage from the shipyards during the early part of the year, report that the business offered to them during the season thus far is in excess of their capacity. Every freight line, it is said, could have used a larger fleet to advantage. The "liners" have not monopolized the lake trade, either. In August one agency at Chicago chartered "tramp" vessels to move over 2,000,000 bushels of grain, and six other agencies arranged for the carrying of about 8,000,000 bushels more. The shipyards are not likely to remain idle. Capt. James Davidson, the Bay City shipbuilder, says: "Whatever the close of the season may be there will be considerable building. The movement toward craft of immense size and high speed seems at an end, and prospective builders favor steamers of 2000 tons or 65,000 bushels capacity, and power to make 12 miles an hour. They seem to think that with the class of freight the lake marine has to carry a higher speed is not economical, and boats that can get around the harbors easily are the most satisfactory."

The third of a fleet of six steel steamships contracted to be built by the Globe Iron Shipyard, at Cleveland, was launched on the 4th inst., and will at once take her place in the Northern Line, between Buffalo and Duluth. She is called the Northern King. Two more steamers of

the same line are already on the blocks, and still another goes onto the blocks from which the King was launched. The Northern King is an exact duplicate of the two already finished, being 312 feet over all, 292 feet keel, 40 feet beam, and 24½ feet hold. Her power is also the same, a triple expansion engine, cylinders, 24, 38 and 61 inches, with a 42-inch stroke. Her estimated carrying capacity is 2800, and cost \$220,000. Her draft yesterday was 6 feet 7 inches aft and 3 feet 10 inches forward. The fleet is said to have no equal on the lakes.

The crush of baggage at the various railway stations in this city during the past week will be memorable, passing all experience subsequent to the great blizzard. A single train at the Grand Central Depot brought nine carloads of it. At several points the storage capacity was unequal to the demands, and a delay of three days in making a delivery was not unusual.

The greatness of the State of Ohio was a prominent topic in Governor Foraker's address at the opening of the centennial exhibition in Columbus last week. "During this century," he said, "the whole of the 26,000,000 acres of our area has been subjected to the uses of man; more than 17,000,000 of these acres have been put under actual cultivation, with the result of an annual yield of more than 100,000,000 bushels of corn and more than 40,000,000 bushels of wheat, with all other agricultural products which our climate admits in due proportion. We have 600 coal mines, that give us an output of more than 8,000,000 tons of coal annually. We have more than 7000 manufacturing establishments, almost as varied in character as are the wants and purposes of man, in which are invested a capital of more than \$200,000,000. In these establishments 250,000 men, women and children find remunerative employment, and from them we have products, fabrics and wares amounting annually to more than \$400,000,000, which go out into all the channels of trade and commerce, to literally gather from the ends of the earth rich rewards for the labor, skill and ingenuity of our mechanics and artisans, and add to the fame and name of a progressive and enterprising people. We have, in short, where there was nothing a century ago, a grand aggregate of nearly 4,000,000 of people and five thousand millions of wealth. We stand as a State in the front rank with the greatest States of the great American Union."

All the wooden culverts and short bridges on the Delaware, Lackawanna and Western Railroad are being replaced with substantial iron structures. There are but few of the original wooden bridges left.

The now venerable Dr. Joseph Francis, inventor of the metallic lifeboat and other life-saving appliances, is now 86 years old. A few days ago Congress awarded him a gold medal with a suitable inscription, to be presented by the President of the United States "in recognition of his eminent services." Emperor Napoleon, before whom he gave a special exhibition of his life-car, knighted him and gave him a gold snuff-box. The box was studded with 86 diamonds. The Emperor of Russia created him a knight of St. Stanislaus, and when he returned home he found that his life-car and pontoon wagons for naval and military purposes had been adopted by this Government.

New Orleans is expecting to become a great lumber port, now that railways give it a better connection with the Yazoo delta, of Mississippi, the future field of hardwood lumber production. It is the port also of the pine country along Lake Pontchartrain and the line of the Illinois Central, and of the great pine region lying

along both banks of the Red, and finally of the cypress forests of the Mississippi and Atchafalaya. It will thus be seen that all the leading varieties of lumber meet there, pine from half a dozen sections, cypress and the varied valuable woods of the Yazoo delta.

The Louisiana sugar crop of the last year was the largest since the war, and exceedingly lucrative. The production amounted to 285,000 hogsheds, an increase of 139,000 over the previous year, and the yield of molasses was nearly 22,000,000 gallons. The coming year promises a still larger increase.

Bernard Gallagher, a well-known local contractor, has been awarded the contract for completing the new Federal building in Brooklyn at his bid of \$860,000.

There are 4000 acres of mud flats in front of Jersey city and Bayonne which it is proposed to utilize by building a series of wet piers, with channels between them of sufficient depth for the passage of large vessels. A Legislative committee of the State of New Jersey regard this plan as feasible.

The heavy shipments of wheat from California to France are regarded as a sure indication that Europe will require much larger supplies from America than it did last year. Already this season the exports from San Francisco to France exceed by more than 50 per cent. those to Great Britain, whereas in the last harvest year to date France took no wheat from that port.

A syndicate of New Yorkers and Europeans, headed by H. B. Hollins & Co., represented by H. M. De Thysebaert, and Robert Colgate, represented by M. L. Guiraud, have signed a contract with the Mortgage Bank, of Mexico, whose charter was granted by the Mexican Government, in 1882, previous to that of the National Bank of Mexico. The principal condition of the agreement with the bank was the granting by the Government of certain modifications to the charter, so as to enable the bank to carry on a general banking business and issue certificates of deposit in silver and gold, in dollars, payable in the Republic or abroad. The combination has for its object the uniting of the silver production of Mexico with that of the United States, so as to make the silver market in New York instead of London. It is stated at Mexico that Mr. Jordan, of the Western National Bank, New York, is the moving spirit in the enterprise.

The Mallory line of steamships to Florida has been temporarily withdrawn because intermediate Southern ports are closed against infection from Jacksonville.

The official crop report of Russia is favorable. According to the reports received by the Ministry of the Interior up to August 16, the harvest of winter wheat in European Russia is now almost completely gathered, the yield, except in a few districts, being satisfactory, or at least an average one. The condition of the summer crops is generally good. In the Governments of Moscow, Smolensk, Kaluga, Pensa, Orel and Nijni-Novgorod the hemp seed and peas were first injured by insects, which, however, disappeared with the cool weather which subsequently set in. The damage caused in July by hail, from the effects of which the Governments of Poltava, Kursk and Kielce suffered most, is estimated altogether at about 3,000,000 roubles.

The so-called "jute bagging trust" excites unusual commotion at all the cotton-trade centers in the Southern States. The feeling thus aroused against alleged extortion is being turned to advantage for the encouragement of local industries. At New Orleans cotton planters are introduc-

ing what is called "osnabergs" of a heavy quality as a substitute for jute bagging, and in South Carolina a species of pine straw bagging is in high favor, after experiments to show that it is not only durable, but as well adapted as any other to resist the danger from fire. The National Board of Marine Underwriters decide that no discrimination will be made by them against cotton covered with any light-weight, close-woven material of reasonable strength.

There seems to be no real ground for the discussion which has arisen respecting the nationality of the soil upon which the St. Clair Canal was built, although it is conceded that had there been a slight error in its location Canada might well have disputed the title. A special dispatch to Detroit says: "Major Lydecker, formerly of Detroit, who was captain under General Cram, the engineer who had charge of the surveying of the line for the St. Clair Flats Canal, and David Enright, now topographer of the Post Office Department, who was engaged in the office with General Cram during the construction of the canal, are both thoroughly familiar with it. Mr. Enright said there is not the least doubt that St. Clair Flats Canal is in American waters. When the appropriation was originally granted a survey of the proposed canal was made by Captain Lydecker. This was the original survey, and established the axis or center line of the canal. When the canal was opened for traffic the Canadians gave out exultingly that the canal was in Canadian waters. This was 20 years ago. The Canadian newspapers having paid much attention to this matter, an order was sent to General Cram, the engineer in charge of the work, by General Humphrey, then chief of the engineers, directing him to resurvey the axis line, and a second time Lydecker established it by a very accurate survey of triangulation."

The annual statement of the Controller of the city of Philadelphia shows that the increase in property valuations during the year has been \$22,261,425, and there is an aggregate of over \$25,000,000 in the sinking fund toward the extinguishment of a debt of \$57,826,405. The Controller calculates that the present tax rate—\$1.85 on the \$100—will yield next year \$386,237.49 in excess of the amount which the same rate will yield in 1888.

The Canadian Pacific Company expect to have their extension across the State of Maine so nearly completed by the latter part of September that by using the track of another road a portion of the distance they can carry freight to and from St. Johns, N. B., thus coming in direct competition with the Intercolonial Railway, and also with other railways of Maine.

An action brought against the owners of grain elevators in this city will soon be brought to trial, to test the constitutionality of the new law regulating the charges for handling grain, which, it is said, is successfully evaded. The elevators, it is alleged, charge an excess of $\frac{1}{2}$ cent per bushel. When it was proposed to regulate and lower the price of direct transfers at the two ends of the canal it was shown by competent witnesses that if the reduction was made and maintained it would mean a vast increase in the volume of business, but for some reason it has not been enforced, and the State of New York and the people suffer in consequence, while the railroads prosper accordingly. One result is that much of the grain goes from the West through Canada to Europe, being forced outside of the State.

The New York, New Haven and Hartford Railroad Company have discontinued building their own engines and cars, as the shops are taxed to their utmost making necessary repairs to the rolling stock.

MANUFACTURING.

Iron and Steel.

William Grover, Rookery Building, Chicago, whose iron tank works are at East Chicago, has recently found his business accumulating so rapidly that he will be forced to extend his facilities. When his contemplated improvements are completed the works will have double their present capacity. His specialty is the manufacture of tanks to hold oil for fuel.

Ground will shortly be broken at East Chicago for the erection of a large car-wheel works. A plant is also to be built in the same locality for the manufacture of dump cars, stationary engines, &c. The names of the projectors are not yet announced, owing to the necessary settlement of some preliminaries, but definite arrangements have been made for the erection of both works.

The Union Steel Nail Company, of Omaha, Neb., have been offered a bonus of \$50,000 cash and four blocks of ground to remove their works to St. Joseph, Mo. It is understood that the offer has been accepted and arrangements made for the removal and re-erection of the plant, which is estimated to require about 90 days.

All departments of the plant of the Central Iron and Steel Company, of Brazil, Ind., started up in full on the 23d ult. with excellent prospects for a steady run.

The Brier Hill Iron and Coal Company, of Youngstown, Ohio, have purchased the old Eagle Furnace, formerly operated by the Eagle Iron Company, at Oreton, and will dismantle it. Part of the furnace will be removed to Brier Hill, and be erected there, and the remainder will be sold for scrap. It was one of the first furnaces erected in the Mahoning Valley, being built in 1846, by David Morris, Jonathan Warner, Harvey Sawyer and William Philpot. It has been idle since 1883. The above firm have just closed a contract with McClure & Schuler, engineers and contractors, of Pittsburgh, for the erection of a plant of the Massicks & Crooks patent fire-brick stoves for their Tod furnace. This is a new departure for the Mahoning Valley, being the first fire-brick stoves erected in the valley.

All departments of the works of the Belmont Nail Company, of Wheeling, W. Va., are being operated to their utmost capacity. The blast furnace of this company produced 3300 tons of Bessemer pig iron for the month of August, just closed.

Negotiations for the lease of the Laclede Rolling Mills are still in progress. Mr. Wilcox, president of the Western Steel Company, is reported as having made offers to take the works, and Colonel McNair, of the Missouri Furnace Company, has also been named in the same connection as a party in interest. The former operators of the works, the Laclede Plate and Sheet Mill Company, or at any rate Mr. Paddock, the president of that company, have also been negotiating to secure another lease of the works. We understand that a proposition has been submitted to Mr. Paddock by the Laclede owners and is now being considered by him.—*Age of Steel, St. Louis.*

It is proposed to build two 75-ton furnaces at Radford, Va., and Mr. George T. Mills, who is at the head of the enterprise, reports that \$270,000 have been subscribed, leaving only \$30,000 to be raised.

The syndicate of creditors who recently purchased the rolling mill plant of Graff, Bennett & Co., at Pittsburgh, are making preparations to put the Clinton Blast Furnace, which is located on the south side, in operation. After the furnace has been

started up and a stock of pig iron secured, the rolling mill will be put in operation. If the syndicate finds they are successful in running this plant the Clinton Rolling Mill will also be put in operation. All the old employees will be given employment if they are good workmen. The plant will be run by the same persons practically as it was when operated by Graff, Bennett & Co. The capacity of the Clinton Furnace is about 16,000 net tons of pig iron annually. It was built in 1859, and supplied the pig iron for use in the puddling furnaces of the mill. The mill was erected in 1846 and is one of the oldest in the country. It has 7 double and 19 single puddling furnaces, 11 heating furnaces, 6 trains of rolls, 42 nail machines and a plate mill.

A charter has been granted to the Boies Steel Wheel Company, of Scranton, Pa. The capital stock is \$500,000.

A new manufacturing corporation has been organized at Pittsburgh, under the name of the Hainsworth Steel Company, with a capital stock of \$500,000, and application for a charter will be made on the 26th inst. Those named in the application as members of the new corporation are William G. Johnston, John Irwin, Jr., Charles Bailey, Thomas C. Lazear, Stewart Johnston and William Lyon, all of whom are at present connected with the Pittsburgh Steel Casting Company. It is also stated that the company will include others equally as prominent in manufacturing circles. The object of the new company is to manufacture rolled cast-steel car-wheels by the new process, and under patents granted to Mr. Wm. Hainsworth, who has been superintendent of the Pittsburgh Steel Casting Company for many years and who will also act in the same capacity with the new concern.

Alice Furnace No. 1, of the Etna Iron Works, Ironton, Ohio, has been blown out for repairs. Blanche, of this company, which has been in course of erection for the past year, will be ready for operations about October 15th next.

Some time ago we made mention of the fact that the plant of the Wheatland Iron Company, at Wheatland, Pa., owned by the Woods heirs, of Pittsburgh, would shortly be put in operation, after an idleness of more than ten years. The new hydraulic machinery which has been in course of erection in the works for several months past, for the manufacture of skelp iron of large sizes, has been completed, and is now undergoing the preliminary tests. It has worked most satisfactory in every particular, and with the utmost smoothness and regularity. The principal part of this machinery is two large hydraulic tables, on either side of the three-high train of rolls. Each table is 50 feet and 3 inches long, and weighs over 22 tons. Each has a side motion of several feet, over which it travels at the will of the engineer, from one set of rolls to another, a perpendicular motion by which the iron is raised from the lower to the upper rolls, or *vice versa*, while the surface of the table is composed of a number of iron rolls, turning to or from the large rolls, for receiving or delivering the iron into them. All these motions are operated entirely by hydraulic power, furnished by powerful pumps, at a pressure of from 100 to 140 pounds to the square inch, and can be put in motion singly, doubly or all together, and stopped, started or reversed instantly at the will of the engineer. Mr. Mattock, of Pittsburgh, the hydraulic engineer who designed and built it, estimates that with three men and three boys it will easily handle 300 tons of iron every 24 hours; that ordinary mills handling the same quantity and kind of iron require 80 men or more on each "turn," a very material saving in labor. Mr. T. S. B. Wood,

of the Wheatland Iron Company, who has given the remodeling of the mill his personal supervision for the past year or more, expects to have the mill in operation and making iron within 10 days or two weeks.

Announcement is made that the prow for the United States cruiser, weighing 12,000 pounds, was successfully cast at the Union Iron Works, San Francisco, a few days ago.

The blast furnace of the Charlotte Furnace Company, Limited, at Scottsdale, Pa., manufacturers of pig iron, was put in blast on the morning of the 5th inst., after a stoppage of eight months, caused by labor troubles. In giving employment to the workmen no discrimination was exercised against members of any labor organization, and the force of men at work comprise a large number of the former employees of the company.

In answer to a report that the workmen in the employ of the Cherry Valley Iron Works, of Leetonia, Ohio, have gone out on a strike, we received the following advice from the company under date of the 4th inst.: "Last week our men (the top and bottom fillers and cinder men only) made a demand of 10 per cent. increase in wages. This we refused to give because we have always been governed by the wages paid in the Mahoning Valley, always paying the same as they do. The men were out two days when they frankly acknowledged being wrong in their demand, and asked to be restored to their positions. This we did, and the blast furnace started up on the morning of the 3d inst. at the old wages."

The New Castle Wire Nail Company, New Castle, Pa., have decided to erect a new wire-rod mill in connection with their works. The mill will be 1000 feet long, and will occupy several acres.

The Bessemer department of the Bellaire Nail Works, of Bellaire, Ohio, produced 6500 tons of steel during the month of August last, while during the same period the blast furnace produced 3964 tons of Bessemer iron. All departments of the works are in full operation with the exception of the nail factory.

The nail factory of the La Belle Iron Works, at Wheeling, W. Va., which has been idle for some time, resumed operations on Tuesday, the 4th inst. All departments of the company's plant are now in full operation.

Riter & Conley, of Pittsburgh, were successful on the 4th inst. in securing the contract for the Twelfth street viaduct in Chicago. The bids were as follows: Chicago Forge and Bolt Company, \$121,558; A. Gottlieb & Co., \$118,678; Detroit Bridge and Iron Works, \$112,020; Riter & Conley, \$109,348. The work is to be completed by April 1, 1889, under penalty of \$50 for every day beyond that date. The length of this viaduct is about two city blocks, and its width is 58 feet 3 inches. It will have two roadways and two sidewalks. It begins at the east line of Clark street, crossing the Chicago, Santa Fé and California and the Chicago and Western Indiana railroads.

The Viaduct Iron Mills, at Coatesville, Pa., which have been idle for seven months, have resumed operations. They were recently purchased at sheriff's sale by Worth brothers, who have other large iron mills at Coatesville. It is understood a new company being formed will also start up the Laurel Iron Works soon.

Machinery.

Dennison & Hamilton, 144 and 146 Lake street, Chicago, have purchased the Wilcox patent stove-pipe groover, and will hereafter manufacture it. This machine can be attached to any tinner's hollow mandrel,

and, when not in use, can be shoved back to the bench. With it a strong boy can groove 400 joints of pipe an hour and produce better results than an experienced man using the old style method. The machine can also be used in making large tin and galvanized-iron conductors. It is easy of action and is operated with an entire absence of the noise produced by the hand groover and mallet.

The Hughes Steam Pump Company, of Cleveland, Ohio, have just made a large export shipment of pumps through their New York Agents, Messrs. Donegan & Swift.

The works of W. P. Davis, of North Bloomfield, N. Y., builder of machine tools, were closed for a vacation on September 5, and will not be reopened before the 19th inst.

The Cooke Locomotive Works are about to be moved from the present site near Passaic Falls, in Paterson, N. J., to a more convenient location inside the city limits, but having spur tracks from the Delaware, Lackawanna and Western and the New York, Lake Erie and Western. The inconvenience of having to team all material as well as the finished locomotives through the streets is so great that it is surprising that the three locomotive-building firms at Paterson should still continue in such an inconvenient location. The new Cooke works will be carefully laid out and arranged on the most convenient plan that experience can suggest.

The Westinghouse Electric Company, of Pittsburgh, have in preparation a series of street car tests for the new Tesla motor. The motor has been reduced to convenient form for storing away in street cars, and several tests have already been made showing its adaptability to street work. The final trials now being arranged for will be of the severest nature. After they are over, if they prove successful, the motors will be put on the market. It is thought that one or two of Pittsburgh's street lines will adopt them if the tests are successful.

The Standard Underground Cable Company, of Pittsburgh, have received an order from the United Electric Light Company, of Springfield, Ohio, for two miles of cable, which will be used to extend the plant of the latter company.

A press dispatch from Wheeling, W. Va., under date of the 7th inst., says: "The Baltimore and Ohio Railroad Company, through their resident counsel, this evening announced to the Council Committee on Railroads that the company had their plans all arranged for the erection of a 32-stall round house, machine shops, not less than 120 feet square, and car shops, construction shops, blacksmith shops, paint shops and other buildings of proportionate size, work to be commenced at once. It was announced upon the authority of General Manager W. M. Clements that these buildings had been originally intended for the Philadelphia Division, but that the company had changed their plans.

During July and August of this year the Babcock & Wilcox Company, of New York, sold boilers amounting in all to 13,162 horse-power.

Among the late shipments of the Dwight Slate Company, Hartford, are ten fine bench lathes intended to make adjusting screws for the Edison phonograph, requiring 100 threads to the inch. Mr. Slate has invented a semi-automatic pinion cutter for small pinions, the index being worked by the reverse motion of the lever.

The Billings & Spencer Company, Hartford, are making a new style seal press for the Keystone Seal and Press Company, New York. It is intended to take the

place of the crude machines now in use, and is being adopted by the railroads to detect the opening of cars *en route*. The W. A. Wood Mower and Reaper Company, Hoosac Falls, N. Y., have just placed an order with them for 40,000 Pitman eyes, weighing over a pound each.

The Chase Turbine Mfg. Company, at Orange, Mass., will shortly occupy their new foundry, which is now about completed.

The Farrel Foundry and Machine Company, Ansonia, Conn., are at work upon the foundations of a new shop 100 x 250, which, when completed, will be used for a foundry. It is to be situated at the north end of their present shop.

Hardware.

The New Castle Wire Nail Company, of New Castle, Pa., are at present considering the question of erecting a steel wire rod mill adjacent to their present works. The company draw their own wire, but on account of difficulty in procuring rods as fast as needed they have about concluded to build a rod mill.

The McCosh Iron and Steel Company, at Burlington, Iowa, are reported to be running their wire nail department full time, and will soon start up their barbed wire works, which have recently been closed down for repairs. They have put in additional engine and boiler capacity with a view of having sufficient power to operate a wire-drawing plant of their own, which they contemplate putting in at some future date should the market price of wire advance too freely.

The works of the Hermann-Parker Hardware Mfg. Company, on Twelfth street, St. Louis, will be dismantled. The lease on which they stand will expire soon, and it is impossible to sell the plant as a whole to any advantage.

R. Wallace & Sons Mfg. Company, Wallingford, Conn., have recently added a new building to their plant, put in new boilers, and in other ways increased the capacity of their factory.

Miscellaneous.

G. W. M. Reed, G. H. Rossett and J. W. Cotton have secured a charter from the State of Illinois for the United States Cold Bending and Coiling Pipe Company, of Chicago. The authorized capital is \$250,000.

The Youngstown Stamping Company, of Youngstown, Ohio, manufacturers of stamped and tinware, have leased a glass plant in the above-named city and will put it in operation as soon as repairs and new improvements can be made. The company use a large amount of glass jars in making oil cans and other specialties they manufacture, and find they can manufacture this glassware much cheaper than it can be bought from dealers.

The organization of the Novelty Steel Wheel Company, with a capital of \$500,000, has been completed in Pittsburgh. It is proposed to go into the manufacture of steel vehicle-wheels, the invention of Dr. A. C. Hall. Interested in the company are Geo. W. Everson, late of the Scottsdale Iron Works. A plant costing \$100,000 will be erected in Little Washington immediately, having a capacity of 30,000 wheels yearly, or 100 sets per day. It will afford employment to 200 men. One buggy manufacturer has submitted an offer to purchase the entire output for a year.

The Tanner Anti-Friction Wheel Company have been chartered at Chicago with a capital of \$500,000. The incorporators are Warren G. Purdy, Frederick W. Porter, Samuel W. Tanner, Frank L. Strong and George H. Fergus.

The Iron Age

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Protection and Progress.

In our recent article on this subject we advanced the proposition that the protection against unrestricted competition afforded by the patent laws and the tariff operated directly to encourage that free interchange of ideas which is the secret of progress. And we think it not difficult to show that the tariff, in particular, may effect in this way a benefit for the whole civilized world, in comparison with which all the arguments, pro and con, as to its other economic effects become relatively insignificant.

The history of the Bessemer manufacture affords a striking illustration. This industry is the favorite theme of those who denounce the protective tariff as the creator of odious monopolies. We hear abundantly of the vast sums which the Bessemer manufacturers have taken from the helpless consumers to enrich themselves. It is not our purpose now to argue that proposition; but we must say, in passing, that the history of the Bessemer business in the United States is by no means the history of a pampered favorite, secured by a sovereign grant in the enjoyment of a sinecure. Whoever will inquire into the struggles, perplexities, losses and failures of its pioneers in this country will confess that they paid dearly for the prosperity of some of their successors. Moreover, it was essentially the patent monopoly, rather than the tariff, that protected them. If there had been no tariff at all, a still completer protection might have been secured (as it frequently is, in similar cases) by an agreement with the owners of the Bessemer patents abroad, giving to the American licensees the exclusive possession of this field.

But what we wish to consider at present is the effect upon progress, both here and abroad, produced by the establishment of the Bessemer manufacture in this country. Without disparagement of the enterprise conducted at Wyandotte, where the first American Bessemer steel was made in 1864, it may be said that the business fairly began with the building of the works at Troy by the late A. L. Holley. Mr. Robert W. Hunt, himself at one time superintendent of the Wyandotte works, declares, in his "History of the Bessemer Manufacture in America," that the Troy establishment was the first to bring the process near to a commercial success. How many times it came near, even in Holley's hands, to commercial ruin, those to whom he confided his troubles and anxieties know well enough. Mr. Hunt's admirable historical sketch, just mentioned, will be found in the Transactions of the Institute of Mining Engineers, Vol. v. p. 201. It presents a vivid picture of the small and perilous beginnings of this great enterprise, and offers a noble tribute to the courage and genius which finally achieved a triumph. The

following paragraph contains in a nutshell the moral of the story :

I must here state that, after building the first experimental plant at Troy, Mr. Holley seems to have at once broken loose from the restraints of his foreign experience, and to have been impressed with the capabilities of the new process. The result is that, mainly through his inventions and modifications of the plant, we in America are to-day enabled to stand at the head of the world in respect of amount of product.

It is not necessary to describe in detail the successive steps by which this result was accomplished, and in which Holley was nobly assisted by Hunt, Fritz, Jones and others. The result itself is what we wish to emphasize, and this is shown most forcibly by a few figures, representing the productive capacity, at various periods, of a two-converter Bessemer plant. Twenty years ago the capacity of the Troy works was claimed to be 40 tons of ingots per day, but this was only the ideal aimed at. It had never been realized. It was in 1868 that Holley proudly announced that his dream of 40 tons per day had been made true at the Harrisburg works. Eight years later, in 1876, Mr. Hunt reported the best achievements of various American Bessemer works up to that time, as follows:

	One day.	One week.	One month.
Pennsylvania.	281	1291	5455
Troy	297	1475	6051
North Chicago	330 1/4	1583	6457
Joliet	350	1528	5367
Edgar Thomson.....	265	....	5403

But the climax was not reached, even by these extraordinary achievements. We can scarcely venture to-day to state the best work performed by two converters, lest we might do injustice to some establishment which had already surpassed it. But if we take as an example the reported operations of the Union Steel Company, of Chicago, in May last, when, in 50 12-hour turns, 28,145 gross tons of ingots were made—a product nearly five times as great as the best of 1876, which was itself more than five times the best of 1868—we show sufficiently what American genius has done with the Bessemer process. It should be added, however, that this vast quantity of ingots was simultaneously rolled, making, for one month, 24,953 tons of blooms and 22,808 tons of rails.

The commercial result in the United States of these and kindred improvements has been to reduce the price of steel rails from \$167 to less than \$30 per ton. The effect abroad has been equally remarkable. In 1868 the announcement of 40 tons as the daily capacity of two converters was received in England with incredulity. Five years later the reports from American works were similarly disbelieved. But facts were too strong to be resisted. Holley, Wm. R. Jones and others put their figures freely before the British Iron and Steel Institute, and the foreign ironmasters were made welcome at American works. The result was the gradual adoption of American designs and methods everywhere. At each step of our advance the same phenomena repeated themselves; disbelief, reluctant admission, eager imitation. It is not too much to say that in this manufacture Americans have dragged the world after them. That steel rails are to-day cheaper than iron ones is a boon which the English or European consumer, quite as truly as the

American, owes to Holley and his colleagues.

The cheapening of transportation thus effected has revolutionized the relations of agriculture. This it is that has made possible the sending of wheat from Dakota to Liverpool. But we need not undertake to review the wide effects of the Bessemer manufacture. They are admitted by all—even by those who seem not to be aware that Americans chiefly brought about the grand result; that they would not have undertaken it at all without protection against foreign competition, and that being so protected they freely communicated to the world their plans and operations, to the unspeakable advantage of all.

The Blast Furnaces on September 1.

During the month of August there has been quite a notable addition to the furnace capacity actively at work, the improvement being confined almost exclusively to the coke furnaces. In the aggregate the figures show the following:

	Anth.	Coke.	Charc'l.	Total.
Aug. 1, 1887.....	37,330	62,001	11,533	111,554
Sept. 1, 1887.....	38,338	83,124	11,505	132,967
Aug. 1, 1888.....	33,397	74,855	11,137	119,389
Sept. 1, 1888.....	33,541	81,032	11,243	125,966

While we have not reached the totals of last year, it is probable that within the current month, and certainly in October, the coke furnaces will go up to 83,000 tons. From the present outlook, however, little progress is expected in anthracite pig iron.

The status of the anthracite furnaces was as follows on the 1st of September:

Anthracite Furnaces in Blast September 1.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New York.....	26	8	2,755	18	4,135
New Jersey.....	15	3	948	12	3,844
Spiegel.....	8	3	219	0	0
Pennsylvania:					
Schuylkill Valley.....	35	16	5,072	19	3,821
Lehigh Valley.....	46	27	9,802	19	4,490
Spiegel.....	1	1	45	0	0
L. Susquehanna Valley.....	23	12	5,162	11	2,642
Lebanon Valley.....	15	14	6,825	1	400
U. Susquehanna Valley.....	18	8	2,713	10	1,880
Maryland.....	4	0	0	4	462
Total.....	186	92	33,541	94	21,674

Again, there has been a slight increase in the capacity blowing, although the large figures of last year have not been reached. We do not hear of any marked movement to increase the number of active plants running on anthracite, as a fuel. For a year past our records show the following figures:

	Furnaces in blast.	Capacity per week.
September 1, 1888.....	92	33,541
August 1.....	93	33,397
July 1.....	92	32,478
June 1.....	99	32,418
May 1.....	96	31,003
April 1.....	94	30,496
March 1.....	98	28,598
February 1.....	97	29,989
January 1.....	118	38,206
December 1, 1887.....	122	39,487
November 1.....	124	40,028
October 1.....	123	39,440
September 1.....	125	38,338
August 1.....	129	37,930
July 1.....	138	40,742

In New Jersey, Secaucus is out, leaving only Oxford, Franklin and Warren at work, with Chester Furnace still banked. In the Schuylkill Valley there have been no changes during August. No. 1 Phoenix was off three weeks with a chilled hearth,

but had recovered and is again running regularly. Warwick was obliged to stop for 13 hours on the 22d ult., on account of the high water in the Schuylkill River, which covered the east house to a depth of 2 feet. Norway has begun to reline and may blow in during October, although it is probable that it will be later. In the Lehigh Valley one of the Coplay furnaces resumed, but, on the other hand, one of the Crane stacks went out. A new hot-blast stove is being added to the equipment of the spiegel furnace of the Lehigh Zinc Company. The product of the furnaces working has been 44,210 in August. In the Upper Susquehanna Valley the Pennsylvania Steel Company are taking down one of their plants, leaving four at work, which have, however, made a very heavy product in August, so that the total of the district was 21,300 gross tons. Katherine blew in on the 29th ult. In the Lebanon Valley the same furnaces are running, their August product being 29,578 tons, of which 20,946 tons were made by seven furnaces, the largest producer of all being the Robesonia. In the Upper Susquehanna Valley the same eight stacks which have been at work for months past made 12,013 tons in August, as compared with 11,529 tons in July. The reports from the furnace companies do not indicate any tendency toward resumption among the idle plants—in fact, some of the companies which blew out during the depression state directly that as yet they do not see enough encouragement to warrant a return to work. What changes there have been and are contemplated are merely brought about by the completion of repairs in progress.

The position of the coke furnaces was as follows on the first of this month:

Bituminous and Coke Furnaces in Blast September 1.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week. Gross tons.	Number out of blast.	Capacity per week. Gross tons.
New York.....	3	2	1,964	1	900
Pennsylvania:					
Pittsburgh district.....	19	15	15,865	4	2,801
Spiegel.....	1	1	371	0	0
Shenango Valley.....	19	13	8,029	6	3,806
Juniata and Conemaugh Valley.....	21	12	5,807	9	3,340
Spiegel.....	1	0	0	1	200
Youghi. Valley.....	5	3	1,172	2	976
Miscellaneous.....	3	2	1,063	1	650
Maryland.....	2	1	250	1	120
Ohio:					
Mahoning Valley.....	14	11	7,446	3	2,150
Hanging Rock.....	11	8	1,899	3	594
Hocking Valley.....	14	4	1,133	10	2,194
Central and Northern.....	17	13	9,133	4	1,716
West Virginia.....	6	3	1,751	3	1,063
Illinois.....	13	9	9,914	4	3,120
Wisconsin.....	4	1	497	3	2,011
Michigan.....	1	0	0	1	250
Missouri.....	6	1	496	5	2,135
Indiana.....	2	1	174	1	240
Colorado.....	1	1	462	0	0
The South:					
Virginia.....	11	8	3,681	3	1,853
Kentucky.....	4	4	991	0	0
Alabama.....	17	12	6,210	5	2,000
Tennessee.....	10	7	2,889	3	1,137
Georgia.....	2	1	483	1	259
Total.....	217	133	81,082	74	33,895

	No. of furnaces.	Capacity per week.
September 1, 1888.....	133	81,082
August 1.....	122	74,855
July 1.....	121	69,543
June 1.....	128	75,427
May 1.....	130	75,815
April 1.....	128	70,644
March 1.....	128	68,892
February 1.....	136	75,912
January 1, 1888.....	143	83,101
December 1, 1887.....	144	88,835
November 1.....	151	90,459
October 1.....	152	89,123
September 1.....	145	83,124
August 1.....	113	62,091

It will be observed that there was an increase in the capacity blowing of over 6000 tons per week. In this New York, the Shenango Valley, Illinois, and notably the Wheeling district participated, while the South, the Pittsburgh district and the Mahoning Valley remained stationary.

In the Pittsburgh district Clinton Furnace, of Graff, Bennett & Co., which has been idle since the failure of that firm, will be put in blast during the present month by the syndicate of creditors who recently purchased the plant. Edith will not be ready for blast before next month. It is being relined and otherwise repaired. Lucy No. 2 was blown out on August 16 for relining and will not be ready for operations before the latter part of October. Soho is almost ready to resume and may go in this month.

In the Shenango Valley Keel Ridge blew in on the 16th ult., and one of the Sharon Iron Company's furnaces was added to the active list during the month. Rosena is to become a producer in a short time. Neshanock, with its increased equipment, made a large product during August, putting it into the ranks of the largest producers in the country. The total output of the valley was 33,883 gross tons for August. In the Juniata and Conemaugh valleys the active capacity was reduced by only one small plant, the August output footing up to 25,273 tons. In the Youghiogheny Valley Charlotte has lately blown in, and Rebecca is soon to resume operations. Centre Furnace is again in blast. During its stoppage eight new boilers have been added to the plant. There is great activity in the Mahoning Valley, where the August product was 32,534 gross tons. A number of the producers report to us that the demand is very heavy, one of them writing:

"Never in our 20 years' experience have we had such a demand for our iron. We stopped selling a month ago, and yet our order book is getting ahead of us by merely trying to take care of our customers." We may state that the company quoted make a specialty of foundry irons and of American Scotch. From the Hanging Rock region, the owners of the Eliza report that they expect to discontinue iron making after October 1st, when the present stock will be used, until prices improve materially. Star is banked for repairs, which it is expected will be completed by the 20th inst. Tropic, as already reported, blew in on the 20th ult. In the Hocking Valley Crafts is soon to smelt, and Fannie is to follow in a few weeks. The only item worthy of mention in connection with the furnaces of Central and Northern Ohio is that Emma started on the 30th ult. In West Virginia Riverside has resumed, and Top Mill which is being relined is expected to resume by the beginning of next month. Illinois is again coming up. Chicago Furnace blew in on the 1st inst., and three of the South Chicago furnaces are at work, with their aggregate capacity of over 4000 tons a week. Union is running three stacks. In Wisconsin Mayville was compelled to blow out on the 16th ult., on account of the bad condition of the bosh wall. It is expected to be in operation again on the 1st of October.

For convenience sake we have grouped together those States usually known in the iron trade as the South. We have not included West Virginia, because practically the furnaces of Wheeling form a district

of their own with a number of the Ohio plants. In Alabama one of the Sheffield and Birmingham Company's furnaces chilled soon after blowing in, and the Sheffield furnace is idle. Bibb, one De-Bardeleben, two Eureka, Mary Pratt, Pioneer, one Sloss, two Alice, two Ensley and one Woodward are running. Williamson is out for repairs. The second De-Bardeleben is to be blown in by the end of October. Gadsden and one of the new Sloss furnaces are to go in this month. In Georgia Cherokee is to be relined, and a new hearth is to be put in.

Charcoal Furnaces in Blast September 1.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New England.....	14	8	605	6	495
New York.....	10	3	390	7	565
Pennsylvania.....	13	4	350	9	724
Maryland.....	13	3	340	10	580
Virginia.....	13	4	153	9	790
West Virginia.....	3	0	0	3	165
Ohio.....	18	8	560	10	695
Kentucky.....	3	3	270	0	0
North Carolina.....	2	1	90	1	80
Tennessee.....	10	5	1,220	5	1,130
Georgia.....	2	0	0	2	114
Alabama.....	10	7	1,290	3	708
Michigan.....	25	12	3,499	13	2,360
Minnesota.....	1	0	0	1	130
Missouri.....	4	2	623	2	320
Wisconsin.....	11	5	1,353	6	680
Texas.....	1	0	0	1	178
California.....	1	0	0	1	230
Washington Ter.....	1	1	390	0	0
Oregon.....	1	1	270	0	0

Total Sept. 1..... 178 67 11,243 109 10,004
Total Aug. 1..... 178 65 11,137 111 10,095

In New England Kent Furnace began operations toward the close of last month. In New York Copake is out. In Virginia Walton was just filling in on the 1st and has begun work. In the Hanging Rock region Jefferson ran only a part of the month. Mount Vernon lost two weeks in August putting in a new hearth, and Olive is temporarily idle for repairs, to be followed by a regular run. Vesuvius produced during the greater part of the month. In Michigan the Detroit and Elk Rapids went out, the latter on the 23d ult. Fayette lost five days through an explosion on the 19th ult.; still the total product of the State for the month was 16,526 tons. One of the Eureka furnaces blew in on the 25th ult. In Wisconsin Hinkle furnace at Ashland resumed on the 22d ult. In the South the only change is that Tecumseh is out for repairs. Rock Run has stopped since the 1st to put in a new hearth and make general repairs. From the Northwest notably come reports that the furnaces are sold up to the close of the present year and beyond that time.

Hardly a day passes but witnesses an attack in the daily press upon the steel rail combination. Classing them among the worst of the iniquitous "trusts," these writers tell the public that the mills have combined under the shadow of an outrageously high duty to rob the country annually of untold millions. The remedy, of course, lies in reducing the tariff, and with that object in view absurd misrepresentations, like Scott's statement of cost of manufacture, are kept going persistently. It is argued that the "steel barons," secure from the intrusion of foreign makers, have killed competition at home, and that the English or German rail maker is the only one who can save an afflicted consumer. The steel rail manu-

facture is the pet example of those who hold the views to which President Cleveland has again given expression in the letter of acceptance just published, in these words: "We believe that these trusts are the natural offspring of a market artificially restricted; that an inordinately high tariff, besides furnishing the temptation for their existence, enlarges the limit within which they may operate against the people, and thus increases the extent of their power for wrongdoing. With an unalterable hatred of all such schemes, we count the checking of their baleful operations among the good results promised by revenue reform." It has always been amusing to those familiar with the history of the foreign iron trade to have steel rails quoted as an example of the alleged close relation existing between trusts and protection. For years the steel rail manufacturers of England and Belgium, both free trade countries, and of Germany, which has a moderate protective tariff—for years makers of these three countries worked under an international syndicate which parceled out the world's markets between them. Now, almost on the day on which the President's letter was published, comes the news that this international association has been once more organized. It is reported that not alone have all the makers of England, Belgium and Germany joined it, but that this time the French works are in the trust. What an added temptation to harmony would be the possession of even a part of the markets of the United States, with their consumption equal at times to that of the rest of the world taken together!

Elasticity of the American Iron Trade.

While the alternate "booms" and depressions in our domestic iron trade are regarded with much solicitude by political economists, some of whom fancy that to correct such irregularities an easy remedy exists in the abolition of tariff duties, yet the manner in which the trade accommodates itself to these varying conditions challenges admiration. The rapidity with which the United States has advanced in the manufacture and consumption of iron and steel, until it now practically occupies first place among the nations of the world, is one of the marvels of the century. It would have been better for all interested if this advance could have been made gradually, each year showing an increase as compared with its predecessor, instead of moving fitfully as it did, sometimes taking leaps and bounds and at others halting, if not retrograding.

Taking the production of pig iron, for instance, to go back no further than eight years, remarkable fluctuations in production are seen. From 1879 to 1887 the output of the blast furnaces of the country more than doubled, amounting to 6,417,148 gross tons the latter year, against 2,741,853 tons in the former year. In this period some years showed a gain of over 1,000,000 tons on their immediate predecessors. In one year, 1886, the increase was over 1,500,000. Yet there were in the same period some years of depression in which the production of pig iron showed a decrease, notably in 1884, when there was a decline of 500,000 tons as com-

pared with the previous year. It is a very simple task to ascertain the net increase in production in these eight years—namely, 3,675,295 gross tons, and dividing that quantity by eight obtain 459,412 tons as the average yearly gain, and theorize as to the more healthful condition of the trade if each year had shown just about such an increase.

Steel rails could be taken in the same way. In 1879 their production, including open-hearth rails, was but 618,851 gross tons, whereas in 1887 the output had grown to 2,119,049 tons, or considerably more than treble. But, notwithstanding the huge net increase, there were years during that period when the production declined instead of advancing. The three years covering 1883 to 1885 witnessed such a movement. But in both 1886 and 1887 an enormous development occurred, the mere gain in each year equaling the entire production of 1879. If the annual increase in production from 1879 to 1887 had been distributed evenly throughout that entire period, each year would have shown a gain of 187,524 tons over the output of the previous year. It is unnecessary for purposes of illustration to take up any other branches of the iron and steel trades, as in the production of all staple articles similar conditions have prevailed.

In no other country in the world do seasons of prosperity cause such an increase in the consumption of iron and steel as in the United States. The rapid growth of population, the enterprise of capitalists in building new lines of railway wherever opportunities of profit are seen either in constructing or operating them, the constantly developing riches of our natural resources and the superiority over other nations of the purchasing power of the masses of our people combine to make the consumption of all classes of products greater *per capita* at any time, but this consumption increases enormously when general prosperity abounds. Our manufacturers then expand their facilities to meet the increased demand upon them, manufacturing establishments multiply, more workmen are called in, new districts are developed, improved methods for securing an enlarged output are devised, and in every way the productive forces of the country endeavor to prove themselves equal to the emergency.

When the active movement has exhausted itself, however—or, in other words, when the floating capital of the country has been absorbed in permanent improvements, a season of rest and recuperation follows, consumption of iron and steel decreases, and manufacturers find themselves with a diminished market. They then quickly adjust themselves to the new condition of affairs. Blast furnaces are blown out by their owners, who prefer to have them stand idle rather than to turn out pig iron for which there is no immediate demand. Possibly the avoidance of the British policy of accumulating large stocks of pig iron in the hands of furnacemen has much to do with the usual rapid recovery of our pig-iron trade from extreme depression. Rolling mills and steel works also restrict their output to the requirements of the situation, and all along the line, from the producers of raw material to the manipulators of the highly finished product, the aim is toward

further curtailment, unless in their restless enterprise individual owners happily discover some new outlet into which they can direct their product.

Under such circumstances as here have been portrayed a gradual increase in production from year to year is impossible. The iron and steel manufacturers do not control circumstances, but, on the contrary, are controlled by them. Even if they had a foreign trade it would necessarily be subject to similar fluctuations.

We have just passed through one of these seasons of curtailment of production, following a period of great activity. Now the skies are again brightening, and the indications favor a renewal of the demand for iron and steel which may perhaps test the capacity of our works and put to rout the prophets who have been predicting disaster as a result of the large number of new establishments built in various parts of the country, but particularly in the South. It would not be at all singular, but in strict accordance with our past experience, if it should be found that these new works, instead of proving a menace to older establishments, have simply been erected in time to meet the requirements of another period of increased consumption.

The Cullom Bill Against Trusts.

Senator Cullom has introduced a bill which thoroughly shows that there are at least a few public men who are willing to become the leaders in a crazy crusade against all associations formed to regulate trade. We have repeatedly emphasized the point that there is some danger that popular opposition to a few gigantic trusts may lead to an indiscriminate assault upon trade associations and combinations. To what lengths such men are willing to go is well illustrated by the bill in question, of which the following is a synopsis:

By the first section all arrangements, contracts, agreements, trusts or combinations between persons or corporations or between persons and corporations, made with a view or which tend to prevent full and free competition in the production, manufacture or sale of any article of domestic growth, production or manufacture, or in the importation of any article produced or manufactured in a foreign country, or in the sale of any article imported into the United States, or which tend to advance the cost to the consumer of any such articles, or which tend to create any restriction upon Interstate trade, or any importation or exportation, or which tend to limit or reduce the production, manufacture or sale, or to increase or reduce the price of any article of growth, production, or manufacture that enters into trade between the States or Territories, or which tend to create a monopoly, are declared to be unlawful combinations, and to be against public policy, unlawful and void. The second section provides that any person entering into any such combination on his own account, or as agent for another, or as an officer, agent or stockholder of any corporation, or as a trustee or committee, or in any capacity whatever, shall be guilty of a high misdemeanor, and be subject to a fine of from \$1000 to \$10,000, or imprisonment from one to five years, or both, in the discretion of the court.

Section 3 provides that all shares of stock and all real and personal property belonging to any such unlawful combination, or to any of the parties thereto, which may be placed in trust or used in furtherance of the purposes of any such unlawful combination, together with all articles of property grown, produced, manufactured, imported, held or kept for sale to advance the purposes thereof shall be forfeited to the United States and liable to seizure.

Section 4 makes it the duty of Customs officers to seize and secure shares of stock and real and personal property made liable to seizure by the bill, and provides that the same proceedings shall be had for the seizure, condemnation and sale thereof, as in cases of seizure of property under the revenue laws. Section 5 provides that out of the proceeds of such sales there shall be paid: First, all costs of seizure, condemnation and sale. Second, claims of the United States for duties or taxes. Third, liens for State taxes and assessments. Fourth, unpaid judgments against parties convicted as parties to such unlawful combinations. Fifth, claims provided in favor of persons injured by means of such unlawful combination.

Of the balance one-half is to be paid into the United States Treasury and the other half distributed to the parties interested.

Section 6 authorizes that any person or corporation injured or damaged by such unlawful combination to sue for and recover double the amount of damages suffered. Any one of the parties to such combination may be made defendant in such suit.

Section 7 provides that the purchase of merchandise or commodities in any foreign country for sale in this country, or in any State or Territory, by any such unlawful combination or its agents, shall constitute a violation of the act and subject the offender to the penalties prescribed.

Section 8 provide that when any action at law or suit in equity shall be commenced in any United States court it shall be lawful in defence thereof to plead in bar or in abatement that the plaintiff, complainant or any other person interested in the prosecution of the case is a member or agent of such a combination as the bill declares unlawful, or that the cause of action grows out of such a combination or out of some business or transaction thereof.

In other words, confiscation of half their property besides the infliction of fines and imprisonment to individuals are to be meted out to those who enter into or are in any way identified with trusts or combinations. Such a proposal deliberately brought before the highest legislative body of the land is not worth serious consideration for its own sake, because the business men of the country have too commanding a voice in its councils. But the very fact that such a bill could be drawn up and presented is in itself significant. To us the proposal to put every trade association into one category is the most striking feature. It is quite useless to deny that public opinion condemns organizations like the sugar trust. Means are being earnestly sought to reach them, and to check the tendency toward forming similar enterprises in other trades. It is possible that opposition to them may become so strong that the tentative measures adopted will bear heavily, not alone on those whom it is the object to reach, but will strike others who should be let alone. Senator Cullom's bill can never pass, but it is not impossible that legislation containing features highly injurious to the manufacturing and trading interests of the country may be approved in a rush to catch popular favor by crushing trusts

The recent advance in old rails has again brought up as a subject for discussion the question how large is the reserve of that rare material still in the tracks. We hear the opinion frequently expressed that before long the supply will be exhausted, and that then certain industries dependant upon old iron rails will be forced to turn to something else. Yet the day when the last iron rail will be taken up is further away than the majority of those interested seem to think, unless the data collected by the authors of Poor's Manual are based

on inaccurate returns. The following statement of the numbers of miles of steel and iron rails in the tracks in the United States shows that nearly one-third of the total track is still equipped with iron:

Year.	Miles steel rails.	Miles iron rails.	Total miles.	Per cent. steel of total.
1880.....	33,680	81,967	115,647	29.1
1881.....	49,063	81,473	130,536	37.5
1882.....	66,091	74,369	140,460	47.3
1883.....	78,491	70,692	149,183	52.7
1884.....	90,243	60,254	150,497	57.6
1885.....	98,112	62,495	160,607	61.0
1886.....	105,724	62,324	168,048	62.9
1887.....	128,950	60,388	189,337	68.1

In seven years the mileage of iron rails has been reduced by 21,579 miles, so that at the same rate of exhaustion the supply would last nearly 20 years longer. Of course there are many considerations influencing the rate at which our bar mills and the works running on track material draw on the reserves. The questions of the relative cost of new steel rails, of accessibility of the old material, of the future demand for finished product, of the relative cost of old iron and new steel, angles, bars, spikes, &c.—all these considerations affect the problem. But the scare of an early end of the supply of old rails may as well be dismissed. They will last ten years longer at least.

Relations with China.

There is reason to fear that the hasty rejection of the Chinese treaty by both houses is a grievous mistake. It is an offense against a friendly power that cannot be justified. Moreover, the legislation proposed assumes that evils exist which are merely hypothetical. Under the present laws no invasion of Chinese emigrants has occurred which need excite alarm. Taken at the worst, the bland and meek-eyed Chinaman is not to be compared with specimens of some other nationalities. It is to be borne in mind that there exists a British influence exceedingly hostile to American interests in China, and is quick to turn to advantage any legislation inimical to the Chinese Government which may take place in the United States. Therefore, it is hardly worth while to hazard international relations and to embarrass our foreign commerce with a vast empire like China, to say nothing of the injustice involved, while seeking to correct evils more imaginary than real, and which may exist only somewhere in the remote future.

It is doubtless true that China is now entering upon an eventful period in her history; momentous changes affecting her civilization are imminent. At this moment several important enterprises are pending in this country, prominent among which are grand schemes for railway improvement to which the Government is impelled to commit itself, however, reluctantly in consequence of advances making by Russia in the same direction. A new system of finance is also in contemplation, as seen by the negotiations of Count Mitkiewicz, Mr. Barker and others of the alleged American syndicate. Americans have ranked high in the estimation of the leading statesmen of China, and there is reason to believe that American influence might acquire an important ascendancy both in diplomacy and in trade, as compared with Great Britain or any power, were it not for the rash and ill-considered measures agitated at Washington.

CORRESPONDENCE.

The Chemistry of Foundry Irons.

STIRLING FURNACE, STIRLINGTON, N. Y.,
September 8, 1888.

To the Editor: I regret that I have been unavoidably delayed in answering the valuable contributions on above subject from Messrs. Chauvenet, Birkinbine and Uehling, but will now take them up separately and make a few remarks on some of the main points presented by them.

By adding the point made by Mr. Chauvenet on the amount of graphite present in open and close iron, I must certainly modify the latter part of my sentence, viz.: "An open iron was sure to have a high percentage of graphite, and a close iron a low percentage of graphite." This sentence was carelessly written, for the latter half should have been omitted as misleading. I am grateful to Mr. Chauvenet for having called attention to it, as it might have led to difficulties had a furnaceman tried to induce a founder to accept a close-grained but graphite iron, such, for instance, as mentioned by Mr. Chauvenet. The point I endeavored to make was that in an open foundry iron graphite was sure to be sufficiently high for all its purposes, and at present, while the founders will accept nothing but open-grained iron, it would have been waste of time to determine graphite in every sample. I fear it will remain so for some time to come to analyze close iron for graphite, as the average founder would not accept it, no matter if told it contained 4 per cent. of graphite. The point here discussed was very excellently stated in one of your editorials. It is just on this point that analysis would be of great value to the furnaceman, if he could only get the founder to accept analysis as one of the tests of the iron. Of course it is necessary to have physical tests, such as Keep's, go hand in hand to obtain the best results, but even analysis alone would be an important factor if thereby such iron as described by Mr. Chauvenet could be sold on equal terms with open iron from the same cast, for such iron is certainly of equal value with the open iron. Yet it may prove hard to convince the skeptics in the foundry trade of this.

I was much interested in the statements made by Mr. Birkinbine regarding cost figures of Scotch irons at Memphis, which show plainly how far even the financially far-sighted American founder will go in paying excessive prices for the sake of getting what he assumes to be the only kind of iron, when he can get exactly what is needed for a much lower figure. At the same time, we must not forget to look at his side of the question. He is undoubtedly influenced by the fact that, apparently, the American furnaceman has not fully possessed the same knowledge of exact quality nor the same regularity of product as possessed by the Scotch furnaceman, and that he (the founder) has therefore really not been able to get just what he needed with sufficient regularity, and hence would run risks, which made him prefer the higher priced but surer article. Yet it seems to me where the founder is at present to blame is in the apparently utter indifference of all but the largest concerns to all questions of scientific import, thereby naturally discouraging the progressive furnaceman from adopting a scientific basis; for certainly, if the founder is not going to encourage the furnaceman in his efforts it will not pay the latter to go ahead, spend the money, and yet have as hard a time as before to convince his customers of the quality of his metal. The almost total absence of all reference in foundry papers on the remarks of Messrs. Chauvenet, Birkinbine and

Uehling certainly seems to give proof to the above remarks.

I furthermore agree perfectly with Mr. Birkinbine in contravening the statement that the analysis will settle the quality of the iron, for the defining of the analysis must be accompanied by physical tests, such as Keep's tests.

There is one point about Mr. Uehling's interesting letter that I would caution against. He speaks about iron being chilled by running into wet beds, and infers that it may be as good as the rest of the chilled iron. I do not believe he meant it in that way, but it reads so, and might be misleading. The close iron can only have the same value if it has the same graphite. Close iron made in the way described by Mr. Chauvenet—i. e., run a little slow, but not chilled—will have practically the same graphite while chilled iron will not—its graphite having been converted into combined carbon. This is especially instanced in the last part of my original notes and analysis on sows and pigs.

As to Mr. Uehling's final statement that the value of graphite is overestimated, I am hardly prepared to accept that *in toto*, judging from all experiments and general information on the subject. Yet he may be nearer right as to the ultimate results than I am. Furthermore, the very interesting, and, if fully sustained, very valuable, work of Messrs. Keep, Maybery and Vorce on the effect of aluminium on foundry irons seems to point very strongly to the fact that graphite is the ruling factor. If you will permit me I will make a few remarks on this work, as also on the discussion between Messrs. Keep and Hammer, in your next issue.

I will now, in conclusion, call attention to a very thorough series of experiments made by the German Government, in 1877, under the direction of Wachler, at the instance of a number of leading German ironmasters. The conditions there existent were similar to ours here, but in a stronger degree. Scotch and English irons ruled the market on the upper grades; all foundries used these as their fundamental compounds, to the detriment of the German irons, which they considered inferior. The Government was finally induced to undertake comparative investigations between German and foreign works, which, when conducted with the utmost impartiality, proved the full equality of the two works and sufficiently stirred up the German foundries to the actual conditions, eventually greatly benefitting the home industries. But, as a sad commentary on the doctrines of free trade, a supplementary note by the author, a few years later, stated that although the scientific gains had been very great the actual gains, owing to then existent free trade, had been practically *nil*, as the foreign irons, owing to the peculiar adaptability of Great Britain for cheap iron manufacture, were put on the German market at such greatly lower prices that in spite of an increased demand for German irons these were unable to compete in price, and many works forced to shut down.

CARL A. MEISSNER.

Influence of Aluminium Upon Cast Iron.

BRADFORD, CONN., September 11, 1888.

To the Editor: Permit me, Mr. Editor, to thank Mr. Keep for the additional facts submitted in his letter of September 1. It seemed to me that to a cautious reader of his original paper this supplementary information was essential to an appreciation of the precise value of his experiments; but, even in the new light, it cannot but appear desirable that the introduced aluminium should be free from the company of that most potent element in determining the physical status of cast-iron—silicon. Mr. Keep seems inclined to doubt the ef-

fect of small quantities of silicon, but he shows his entire understanding of the subject by adding: "Although, by inference, we have a right to assume that any amount of silicon does produce a corresponding effect." However, we are not left to the philosophy of inference in this matter. In the words of Mr. Outerbridge—quoting from his paper in the Franklin Institute *Journal* for March: "A very small variation in the percentage of silicon produces a prodigious effect in this particular"—referring to the influence of silicon upon chilling quality. The researches of Mr. Ford in accounting for the great difference in the working of hot and cold blast pig iron and in discovering the qualities which determine the durability of car-wheels, also the experiments of Colonel Caron, a French scientist, who, in testing steels, discovered the property that minute quantities of silicon have, in obstructing the process of hardening by retaining the carbon in a graphitic or semi-graphitic state—such results, it seems to me, may be taken as definitely establishing the fact that "any amount of silicon does produce a corresponding effect." But precisely what this effect shall be cannot—in the present state of our chemical knowledge—be predicted.

Aside from the mistake in quoting the amount of sulphur, which was either a slip of the pen or the printer's fault, I think this is where Mr. Keep misunderstands me; for in venturing the statement of the effect of small quantities of silicon I did not intend its application to the particular iron he dealt with, but rather to publish my own experience with some irons and to show that in some cases sufficient silicon might be introduced in such an alloy to materially affect the mechanical properties of the iron. The sensitiveness of cast iron to the introduction of silicon would seem to depend upon the proportion of the contained phosphorus, sulphur, and especially manganese, and it can be readily understood that the same quantity of silicon which added to one iron would effect a complete change might in another case produce no appreciable effect. My knowledge of this fact would of course have prevented me from making any assertion with regard to the particular irons used by Mr. Keep; but as an interested and appreciative reader of his paper it seemed to me impossible to arrive at even a general conclusion touching the influence of aluminium until it was known what account had been taken of the introduced silicon. Thanking Mr. Keep again for the courtesy he did me by his reply, I am, Mr. Editor,

Yours truly,

ALFRED E. HAMMER.

The Naval Reserve.—The *Marine Journal* publishes the following list of American steamers which will answer the requirements of the Naval Reserve bill in regard to speed:

Vessel.	Halling Port.	Tonnage.	Speed.
Newport.	New York.	2,735	17.9
City of Augusta.	Savannah.	2,870	16.5
City of Puebla.	San Francisco.	2,824	16.5
Queen of the Pacific.	Portland, Ore.	2,728	16.7
Alameda.	Philadelphia.	3,158	16.5
Mariposa.	San Francisco.	3,158	16.5
State of California.	San Francisco.	2,208	16
Alliance.	New York.	2,985	16
Louisiana.	New York.	2,840	16
Ohio.	Philadelphia.	3,128	15.6
Saratoga.	New York.	2,426	15.4
City of Alexandria.	New York.	2,480	15.4
Nacoochee.	Savannah.	2,680	15.4
Chattahoochee.	New York.	2,678	15.4
Roanoke.	New York.	2,354	15.4
Excelsior.	New York.	3,264	15.4
Alamo.	New York.	2,943	15.4
Lampasas.	New York.	2,943	15.4
El Paso.	New York.	3,531	15.4
El Dorado.	New York.	3,531	15.4
H. F. Dimock.	Boston.	2,625	15.4
Herman Winter.	Boston.	2,625	15.4
Seminole.	New York.	2,557	15.4
El Monte.	New York.	3,531	15.4
San Pedro.	New York.	3,119	15.4
San Pablo.	New York.	4,064	15.4
Cherokee.	New York.	2,557	15
Santa Rosa.	New York.	2,417	15

The Navy Department has thus accredited 28 American steamers of from 2400 to

4000 tons, with a sea speed of 15 knots or over, and from these vessels, should the Naval Reserve require them, selections will be made.

Losses on the Atlantic.

It is certainly a startling fact that in the space of 47 years since the unfortunate President left New York on March 11, 1841, never again to appear to mortal ken, nearly 100 fine steamers have been utterly destroyed while on their passage across the Atlantic. Of these, eight, after leaving port, mysteriously disappeared and have never since been heard of; ten were run down in collision; five were burned; one ran on sunken ice in the Straits of Belle Isle; three foundered in mid-ocean, and the remainder of the melancholy list were wrecked either on the Irish and British coasts, on those of America, or on islands or rocks off them. Fully ten of these ran in foggy weather on the shores of Nova Scotia or Newfoundland on their westward voyages, a sufficient warning, it might be supposed, to captains to give a wide berth to those latitudes. Only one, the Iowa, an American steamer, was wrecked on the French coast, near Cherbourg, in 1864. It is generally supposed that shipwrecks are caused by the rage of the elements, but of all the vessels that went ashore only three or four appear to have directly suffered in consequence of heavy weather. Miscalculations as to distances run and courses steered, clouded skies, dark nights, and more than all, dense fogs, were the primary cause of the disaster.

Comparatively few of these shipwrecks occurred without serious loss of life, at least 5600 persons having perished among the passengers and crews who were on board. When the Atlantic was wrecked on Meagher's Head, off the fatal Nova Scotian coast, in 1873, no less than 562 persons were drowned. With the City of Glasgow 480 people disappeared; with the President, 120; with the Pacific, 186; and with the City of Boston, the last of the missing steamships, 191. When the Austria was burned in mid-ocean 470 lives were lost; with the Arctic, 323; with the Anglo-Saxon, 372; with the Ville du Havre, 226; with the Borussia, 200; and with the Schiller, 311. The destruction of other vessels caused the loss of fewer lives than the vessels named, as, happily, fewer passengers were on board, but with several on the list from one to 200 beings perished. In 1873 no less than six large steamships were wrecked, run down or disappeared, the most disastrous losses being those of the Atlantic and the Ville du Havre, a total of 788 lives.—*Harpers' Weekly*.

The H. C. Frick Coke Company, of Pittsburgh, have posted notices at all their works in the Connellsville region to the effect that the wages of their employees will be advanced 5 per cent., the advance to take effect from September 1. The advance is a voluntary one and is taken as an indication that there is a decided improvement in this industry, both as regards demand and selling price.

In a lecture delivered last December before the Franklin Institute, Mr. John Birkinbine refers to a peculiar and apparently isolated deposit of Clinton fossil ore, which exists at Iron Ridge about 50 miles north of Milwaukee, Wis. The ore soon after mining breaks into grains which from their shape, size and color have given to it the name of "flaxseed ore." Another deposit of fossil ore is reported further north in Wisconsin. The Iron Ridge ore carries such proportions of phosphorus, lime and silica as to invite attention to it for use in producing steel by the basic process.

TRADE REPORT.

Pittsburgh.

Office of *The Iron Age*, 77 Fourth Ave.,
PITTSBURGH, September 11, 1888.

While there is no disputing that there has been an important and legitimate improvement in the general Iron and Steel business within the last 60 days, there is evidence of an intended boom on the part of speculators, who are anxious to excite the market and run it up higher, but it is not likely that they will be successful. Already the feeling begins to obtain on the part of the trade generally that the danger line has been reached; that much higher prices will stimulate importations from foreign countries, which they are anxious to avoid. It is believed that a good many sales are reported that never were made, from the fact that the prices are considerably higher than other offers are being made to sell at. This species of manipulation may do in stocks, oil or wheat, but it will not do in the Iron trade, which has always been conducted upon a legitimate basis, and is governed and controlled by the law of supply and demand.

The general position of the Iron market is fairly satisfactory; there is an increasing volume of business, but prices of the products have not as yet got up to correspond with the enhanced cost of the raw material, and there is a good deal of complaint in consequence. As it is now mill owners cannot get cost out of the finished Iron, and it is evident that either the one will have to advance or the other decline.

Pig Iron.—The market is active, sales of some 15,000 tons having been reported, in addition to a good deal of business which is not made public. As regards prices, there has been no quotable change. Consumers generally are very well stocked, as they have been buying pretty freely ever since the market began to advance, and having bought at prices much below those now current, and believing, as many of them do, that the upward turn has been arrested, it is not strange that they are now holding off. However, furnacemen are generally well sold up, some of them for the remainder of the year, but additional furnaces are being started up and production increased. Furnaces that have been idle for several years are being placed in readiness to start up—among other the old Clinton, which will be operated by a syndicate of creditors of Graff, Bennett & Co., the former owners. The market is being watched with a good deal of interest, as it is believed by many that the highest point has been reached, and as a consequence there is more disposition to sell and less to buy; however, there is no indication of anything like a collapse, nor is such a thing at all probable, but there is reason to believe that the market will settle down at present prices, which may be fairly quoted as follows:

Neutral Gray Forge.....	\$16.00 @ \$16.50,	cash
All Ore Mill.....	16.75 @ 17.00,	"
No. 1 Foundry.....	17.50 @ 18.00,	"
No. 2 Foundry.....	16.25 @ 16.75,	"
No. 3 Foundry.....	15.50 @ 16.00,	"
No. 1 Charcoal Foundry.....	23.00 @ 24.00,	"
No. 2 Charcoal Foundry.....	21.00 @ 22.00,	"
Cold Blast Charcoal.....	25.00 @ 28.00,	"
Bessemer Iron.....	18.00 @	"

There have been sales of Bessemer reported at \$18.25, cash, but your correspondent has heard of no reliable sales above \$18, cash, and some of the brokers say they are still prepared to make additional sales at the price quoted. In regard to Mill Iron, there have as yet been but few sales at \$16.50, cash.

Muck Bar.—There have been sales at \$29 @ \$29.25, cash, showing but little change on the prices of a week ago. While it is true that some sellers are holding for

\$30, and refusing to sell for less, thus far we know of no sales having been made above \$29.25, and buyers have no trouble in getting what they want at the prices quoted. It is said that there is a very fair margin for profit at present prices.

Manufactured Iron.—There is a continued fair demand for Merchant Iron, and prices are firm, although as yet they have not advanced as much as the raw material; both jobbers and large consumers, impressed with the belief that prices may go still higher, are buying pretty freely, and the mills generally are fully employed. Some mill owners are not disposed to contract for future delivery at present prices. We quote Bars at 1.80¢ @ 1.85¢, 60 days, 2 ¢ off for cash. There is an increasing demand for Skelp; those mills making a speciality of it have about all they can do; Grooved is quoted at 1.80¢ to 1.85¢, and Sheared at 2¢ @ 2.10¢.

Nails.—While trade continues dull for the season, the market is firmer, owing to increased cost of Nail Slabs, which have advanced \$1 @ \$1.50 per ton, as compared with the lowest. That the market has stiffened is evident from the fact that buyers are now willing to pay card rates, which they refused to do until within the past week. This proves that makers west of here who have been cutting, are now exacting full rates. The demand, while somewhat better, is poor for the season, and not likely to amount to much this fall; at least there is not much indication of it at present. We continue to quote at \$1.90, 60 days, 2 ¢ off for cash.

Wrought-Iron Pipe.—There is a fair degree of activity, but prices continue irregular and unsatisfactory. Some of the old mills, with a trade established years ago, are pretty well employed, but others, of recent origin, new in the business, have but little to do. Some of the latter are doing next to nothing. However, owing to enhanced cost of Pipe Iron, prices are firmer, and the very low rates of a month ago cannot now be obtained. Discounts are quoted at from 55 to 57½ ¢ on Black Butt Welded and 65 @ 67½ on Black Lap Welded; Boiler Tubes 65 ¢ off, large lots.

Old Rails.—There is still considerable inquiry and much limited offerings. The market is firm with sales of American Tees at \$24.50 @ \$25. As yet but few have been sold above \$24.75, which price was obtained for a lot delivered at Youngstown, Ohio. The great trouble with consumers was that they nearly all closed their mills on July 1st with little or no stock, and then when they started up they were on the make at once, which sent prices up faster than they otherwise would have gone. However, the stock of American is light, and foreign cannot be laid down in Pittsburgh at prices quoted. It is claimed that there is an effort being made to manipulate the market, but whether there is anything in it we cannot say.

Steel Rails.—There have been no sales reported here of late, and there does not appear to be much inquiry. However, as the railroads are generally reported as doing well it is thought there will be more miles of new roads built in 1889 than during the present, and there is a possibility of an improved demand for Rails before the close of the present year. We continue to quote heavy sections at \$30 free on cars here.

Railway Track Supplies.—Demand continues light for the season, while prices remain unchanged. Splice Bars, \$1.80 @ \$1.85; Track Bolts, \$2.85 with Square, and \$2.95 with Hexagon Nuts. There may be an improved trade before the close of the present year. The enhanced cost of

Old Rails will add largely to the cost of making Spikes, for which they are largely used, and with anything like a demand Spikes would advance.

Merchant Steel.—There is a fair business reported at unchanged prices. Best brands Tool Steel, 8½¢; Crucible Spring Steel, 4½¢; Crucible Machinery, 5¢; Open Hearth, 2½¢.

Billets, &c.—Bessemer Steel Billets are quoted at \$29, cash, delivered on cars at maker's mill, and the same quotation will answer for Nail Slabs. Domestic Rail Crops and Bloom Ends, \$19.

Old Material.—There is an improved demand for all kinds of Old Material, and prices are firmer and higher. Sales: No. 1 Wrought Scrap, at \$21 net ton; Car Axles, \$24 @ \$25; Wrought Turnings, \$13.50 @ \$14; Cast Scrap, \$15.50 @ \$16, gross; Cast Borings, \$12 @ \$13; Car-Wheels, \$20. There is very little inquiry for Wheels in this market.

The partnership heretofore existing between Jacob P. Koehler and George A. Koehler, under the style of Koehler & Co., dealers in Scrap Iron and Metals, on Pike street, Pittsburgh, Pa., has been dissolved by the retirement of George A. Koehler. The business will be conducted under the same firm name by the remaining partner at the old location.

Chicago.

Office of *The Iron Age*, 95 and 97 Washington St.,
CHICAGO, September 10, 1888.

Pig Iron.—A further improvement is perceptible both as to demand and prices. Quite a considerable quantity of Lake Superior Charcoal Pig Iron has been called for by the Malleable Iron trade, showing that their requirements have not yet been filled, but they have few brands to select from. Car-Wheel manufacturers are not in the market to any extent. If they should be obliged to make purchases, as they soon may with the improving demand for cars, the price of Charcoal Pig will not long remain at its present figures. Soft Coke Irons are very firm, and the prices of some favorite brands of American Scotch have been marked up 50¢ to 75¢. Even Southern Ohio Irons feel the effects of the improving condition of the Iron trade, the large stocks held by the furnaces of that district no longer operating as a bar to an advance. Agents for these as well as for other furnaces are being instructed to leave no propositions open on orders of any size. The condition of Southern Coke furnaces is reported by recent observers, who have visited the active plants, to present very little danger of an excessive supply of Pig Iron being thrown upon the market for the remainder of this year. Prices have been advanced upon such grades as are still unsold to a point which will very probably keep them out of this market for a time, unless the price of Northern Irons is marked up correspondingly. Lake Superior Coke Irons have not advanced as much as the prices of other classes of Pig Iron would seem to warrant, but they now show indications of improvement. Cash quotations are as follows: Lake Superior Charcoal, all numbers, \$19.50 @ \$20.50; Alabama Car-Wheel, \$26.25; Southern Charcoal Foundry, No. 2, \$18.50 @ \$20; Jackson County Softeners, No. 1, \$18.25 @ \$18.75; Hocking Valley, Soft Foundry, No. 1, \$17 @ \$18; American Scotch (Blackband) No. 1, \$19 @ \$20; other Ohio Scotch Irons, No. 1, \$18 @ \$18.50; Lake Superior Coke, No. 1, \$17.50 @ \$18.50; No. 2, \$16.50 @ \$17.50; No. 3, \$15.50 @ \$16.50; Southern Coke, No. 2, \$18; No. 2½ and Open Bright, \$17.50; No. 3, \$16.50 @ \$17.

Bar Iron.—It is difficult to quote prices just now, as the mills seem to be competing with one another to see which can name the highest figure. The range during the week has extended from 1.70¢ to 1.85¢, f.o.b. Chicago, half extras, for carload lots of Common Iron. Of course the mills asking the highest prices are out of the market, but if conditions remain as they have been the cheapest sellers will soon be filled up, and the prices which seem high to day will be looked upon as quite reasonable. Figuring on the basis at which some contracts are known to have been taken in August—namely, 1.50¢, f.o.b. Chicago, and taking 1.75¢ as about the present rate, the advance has been \$5.60 per gross ton. And yet there are believers in a still greater advance, who argue that the car builders will certainly need a great deal of Iron this fall and winter, caused by a heavy increase in the consumption. A great deal of work is in sight among the miscellaneous consumers of Bars, and good business seems to be assured for some time to come. From the comments now being made by manufacturers and their agents it would not be surprising if an attempt should be made to restore the old rate of extras. Store prices range from 1.80¢ to 2.10¢ for Common Iron, with a good demand and firm tone.

Structural Iron.—A fair business has been done in this line. Prices for mill lots are now as follows, f.o.b. Chicago: Angles, 2.35¢; Universal Plates, 2.40¢; Tees, 2.65¢; Beams and Channels, 3.40¢. Store prices are as follows: Angles, 2.40¢ @ 2.50¢; Tees, 2.60¢ @ 2.70¢; Beams, 3.80¢.

Plates, Tubes, &c.—Quite a number of orders were taken for carload lots of Plates and a very good business was done in small lots also. The mills are getting more decided in their views of higher prices, and it seems to be a mere question of time when prices will be advanced here. Some of the Tube mills have notified their agents of an advance, but the others are holding to their former figures. Quotations are unchanged, as follows: Heavy Sheets, Nos. 10 to 14, 2.65¢; Tank Iron, 2.55¢; Tank Steel, 2.80¢; Shell Iron, 3¢; Shell Steel, 3.25¢; Flange Iron and Steel, 4¢; Fire-Box Steel, 4.75¢ @ 5.75¢; Boiler Rivets, 4¢ @ 4.25¢; Ulster Iron, 3.75¢; Boiler Tubes, 60 % @ 65 % off on 2½-inch and larger, and 62½ % off on 2-inch and smaller.

Sheet Iron.—A few mills which had wisely refrained from filling up with orders when prices were at their lowest are profiting by the demand now being experienced. They report sales for October and November delivery at 3.10¢, f.o.b. Chicago, for No. 27, and expect to get 3.15¢ shortly. Jobbers continue to quote small lots of No. 24 at 3.30¢, Nos. 25 and 26 at 3.20¢, and No. 27 at 3.30¢, with a small concession to best buyers. They are having difficulty in getting deliveries from the mills, which seriously interferes with their trade.

Galvanized Iron.—Stocks in the Chicago warehouses are more broken than ever, in consequence of the inability of the mills to ship fast enough to keep up with sales. Prices of large lots are unchanged, but agents are looking for an advance in rates, which they think is warranted by the very encouraging condition of business in this and related branches. Quotations for small lots are as follows: Juniata, 60 and 10 % off; Charcoal, 60, 10 and 5 % off.

Merchant Steel.—An increasing business is reported in the higher grades, showing an improving consumption. Prices are unchanged, store rates being as follows: Bessemer Bars, 2.30¢ @ 2.40¢; Tool Steel, 84¢ @ 94¢; Specials, 13¢ @ 25¢; Crucible Spring, 4.40¢; Open-Hearth

Spring, 2.90¢; Open-Hearth Machinery, 2.75¢ @ 3¢; Crucible Sheet Steel, 7¢ @ 10¢.

Steel Rails.—Small sales have been made, amounting to probably less than 5000 tons in the aggregate. The North Chicago Rolling Mill Company's South Chicago mill will resume operations next week on old orders for this month's delivery. They hope to receive enough new business in addition to keep the mill in operation during the remainder of the fall months. The outlook for heavy trade is not encouraging, although next year is looked forward to with decided hopefulness. An effort is being made to get \$31 on contracts now coming up.

Old Rails and Wheels.—Several thousand tons of Old Iron Rails have been sold at prices ranging from \$24 to \$25. The higher figure now seems to be the ruling quotation, with but a light supply in sight. Old Car-Wheels are very scarce, and transactions are consequently light. A few tons have been picked up at \$18.50 @ \$18.75, but holders generally ask \$19 @ \$19.50.

Scrap.—Business has been dull during the week. The railroads are offering larger quantities than usual for sale this month, evidently to take advantage of the recent advance in prices. Dealers, however, are looking for a slight decline now, as a result of the advance in freights to Pittsburgh and Mahoning Valley points, at which much of the Scrap accumulating here is marketed. Quotations for carefully selected are as follows, per ton of 2000 lb: No. 1 Forge or Railroad Shop, \$19 @ \$19.50; Track, \$18.50; No. 1 Mill, \$15 @ \$15.50; Light Wrought, \$11; Horseshoes, \$18; Axles, \$25; Cast Machinery, \$13.50 @ \$14; Stove Plate, \$11; Cast Borings, \$9; Wrought Turnings, \$11; Axle Turnings, \$13; Coil and Leaf Steel, \$16; Locomotive Tires, \$16.50.

Hardware.—A fair demand for Heavy Hardware is noted. Wagon Stock is rather dull, but in Iron, Steel, Blacksmiths' Supplies, &c., a little more business is being done than in previous weeks. Nuts are hardening in sympathy with the advance in Bar Iron, which may also be expected to affect other Bar Iron products if it is maintained for any length of time. Shelf Hardware is moving, the demand being good from all quarters tributary to this trade center. Commercial travelers are sending in very encouraging reports of the prospect for future business, which it is predicted will assume large proportions as soon as the safety of the corn crop is assured beyond all doubt. Very little speculative buying is now being done, and it will be discouraged by the prominent houses here as much as possible should a tendency develop itself when activity in trade sets in.

Nails.—Some good sales of Steel Nails have been made by manufacturers' agents at the advanced price, but the demand is not general. The Wheeling mills are holding firmly at \$1.90 at mill for large lots, and another advance of at least 10¢ is expected. It is understood that a very important meeting of the Western Nail Association will be held at Wheeling on the 12th inst., which will result in the adoption of measures to sustain the advance. Stocks in dealers' hands here and at other points in the West are reported light. No heavy transactions in Wire Nails have come to light, but sales agents are known to have refused large orders tendered them at the prices ruling before the recent advance. They quote \$2.55, f.o.b. Chicago, as their bottom rate. Store prices are unchanged at \$2.10 for Steel and \$2.60 for Wire in small lots.

Barb Wire.—The buying movement reported last week has grown a little stronger. Manufacturers are making sales

of 50 to 100 tons to dealers in various parts of the Northwest who think this a good time to stock up, and jobbers are also meeting with some demand from their trade. Prices for small lots of Painted are quoted nominally at 3¢ and Galvanized at 3.75¢.

Pig Lead.—With but a light business in progress prices have been maintained between 4.65¢ and 4.75¢. At the close of the week 4.70¢ was bid and 4.75¢ asked.

The Laughlin Nail Company, of Wheeling, W. Va., have issued a very striking circular calling the attention of the trade to their Nails. Their weekly capacity exceeds 10,000 kegs, their factory being the second largest in the world. They make their Nails from Bessemer Steel, made specially for Nails, in their own Bessemer Steel plant. Geo. G. Spencer is salesman, at 115 Dearborn street, Chicago.

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St., PHILADELPHIA, Pa., September 11, 1888.

Pig Iron.—A very satisfactory week's business has been done in Pig Iron, and, doubtless, at somewhat better prices, taking an average of the entire market, although no quotable change can be made at present. But everything is firm, no shading whatever, but a gradual dropping out of sight of the inside quotation, and a gradual tendency to work toward the outside figures. Some fair brands of Iron may yet be picked up at \$16, \$17 and \$18, delivered at tide, for the three grades, but the brands are limited in number, and the quantity available is still more limited. But when sellers begin to talk \$16.50, \$17.50 and \$18.50 to \$19, buyers are by no means anxious to place orders. They would buy largely at the former quotations, but beyond that they restrict their orders to immediate requirements, a kind of business which is quite acceptable to sellers, as they have no wish to discount the future to any great extent. On the whole, therefore, the market may be considered as perfectly satisfactory for the present. Buyers can get all the good Iron they require by paying a very slight advance, and at that advance sellers can market about all that they can spare. This leaves the future open to any changes that may take place. If the demand continues as it has been during the past 30 days, sellers will not only require more money for their product, but will get more money for it in a little while. Consumers will make no objection to a further advance, if they meet with a corresponding demand for their products, without which it would be impossible to inaugurate a successful movement of that kind. As to the probabilities, opinions are somewhat divided. A large business is believed to be assured, but it is doubtful if prices can be increased to even a very moderate extent without inviting a competition which would soon upset things again. There is not enough business on hand or in sight to warrant very hopeful expectations on this point. At a \$1 per ton advance in Pig Iron, and \$2 or \$3 in Finished Iron, production would be greatly stimulated. A good general demand appears to be all that can be hoped for, and this can be easily met by mills and furnaces already in operation. Some time ago they were not running nearly full, while stocks of Pig Iron were accumulating at furnaces. The little turn that everybody was looking for has come, and things are moving nicely, but it may be altogether a mistake to assume that more furnaces and more mills can find a market for their output at advancing prices. All these things are, of course, within the range of possibilities, but for the present they are not regarded as probabilities, hence as this article remarked

last week Philadelphia is inclined to follow rather than lead in the matter of advancing either Pig or Finished Iron.

Foreign Iron.—Buyers are in the market at low prices, but there is not much probability of business being closed. Bids of \$18, c.i.f., duty paid, are being made for 10,000-ton lots, against \$20 asked.

Blooms.—There is a good demand at full prices, but sellers have not been able to establish any advance. Sales chiefly within the following range of prices: Nail Slabs, \$28.50 @ \$29.50; Billets from \$30 to \$35, f.o.b. cars at mill, according to analysis; Charcoal Blooms, \$52 @ \$54; Run-out Anthracite \$42 @ \$44; Scrap Blooms, \$33 @ \$35 $\frac{3}{4}$ "bloom" ton of 2464 lb. Foreign at tide, c.i.f., duty paid, \$29 @ \$30 for Nail Slabs; \$31.50 @ \$32.50 for 4 x 4 Billets, and \$35 @ \$39 for Siemens-Martin, price according to analysis, &c.

Muck Bars.—There has been a very active demand, under which prices were advanced to \$29, Philadelphia, at which figures several lots were taken. Bids of \$28.50 are made for large lots, but the supply is limited, and \$29 a firm quotation.

Bar Iron.—The demand for Bars keeps up remarkably well, and buyers find prices gradually stiffening up. It is difficult to define the exact position, beyond saying that prices are slightly higher. Some mills talk 1.9¢ firm, others 1.85¢, while some would not be likely to refuse a desirable order at 1.8¢ or 1.82 $\frac{1}{2}$ ¢. All depends on circumstances. Those that are full would quote the higher figure firmly, while those less favorably situated might accept the lower figure, so as to get some work ahead. Then the question of quality comes in, so that it is impossible to fix any definite figure and call it a firm price, but it is quite safe to say that an average advance of half a tenth has been made on everything, and is likely to be maintained. Skelp Iron continues to be in active demand, with sales at 1.82 $\frac{1}{2}$ ¢ @ 1.85¢ for Grooved, and 1.95¢ @ 2¢ for Sheared. At the inside figures large orders are still on the market, but mills are pretty well filled up, and a further advance is being contended for.

Plate and Tank Iron.—A moderately large business has been closed during the week, and while sellers generally are asking more money, and getting it possibly in some cases, it would not be quite true to say that prices are higher. There is an impression that prices will be higher, and the outlook seems to warrant that opinion. The general demand is very good, while the shipbuilding interests seem likely to become large consumers during the next 12 months. Government work will be actively prosecuted, and there is reason to believe that a number of private firms will order additions to their respective fleets. In fact, shipbuilding is likely to be carried on during 1888 and 1889 on a larger scale than ever before. The following indicates some of the work which is under consideration: A number of large steamships for service to Australia will be built for Claus Spreckels, whose representative is now on his way to this city. Several large tugs, to be used at San Francisco, will also be constructed by the Delaware River shipbuilders. The Ocean Steamship Company, of Savannah, are about contracting for two steel passenger steamships for the coastwise trade between Philadelphia, New York and Savannah. The Standard Oil Company are contemplating the construction of a new bulk oil carrying steamer for the coastwise trade, and Boulter, Bliss & Dallett, who have sold two of their vessels, are on the lookout for others. The firm now has a vessel on the stocks in Cramps' yard. The Clydes are contemplating a new steamship service in the West Indies,

probably to Hayti and the Windward Islands, and want several first-class vessels. It is said that within a few months the Delaware River shipbuilders will have enough orders on hand to keep them busy for two years, but there are no Transatlantic steamers included in the list. Prices about as follows: Ordinary Plate and Tank Iron, 2.05¢ @ 2.15¢; Shell, 2.4¢ @ 2.5¢; Flange, 3.5¢; Fire-Box, 4¢; Steel Plates, Tank and Ship Plate, 2.3¢ @ 2.4¢; Shell, 2.7¢; Flange, 3¢ @ 3 $\frac{1}{2}$ ¢; Fire-Box, 3 $\frac{1}{2}$ ¢ @ 4 $\frac{1}{2}$ ¢.

Structural Iron.—Business in this department has not shown as much activity as in some others, although the Shape mills will doubtless fall into line soon. Work on old contracts is being actively called for and prices are rather firmer. Prospects moderately encouraging, but nothing specially important in sight at present. Prices as follows: 2.10¢ @ 2.15¢ for Bridge Plate; 2¢ @ 2.10¢ for Angles; 2.6¢ @ 2.7¢ for Tees, and 3.3¢ for Beams and Channels, Iron or Steel

Sheet Iron.—There is a very active demand for specialties, but in other directions there is not much improvement, although stocks are not accumulating to any extent. Good makes in small lots command about the following quotations:

Best Refined, Nos. 26, 27 and 28....3 $\frac{1}{4}$ ¢ @ 3 $\frac{1}{2}$ ¢
Best Refined, Nos. 18 to 25.....3¢ @ 3 $\frac{1}{4}$ ¢
Common, $\frac{1}{4}$ ¢ less than the above.
Best Bloom Sheets, Nos. 26 to 28....4 $\frac{1}{4}$ ¢ @ 4 $\frac{3}{4}$ ¢
Best Bloom Sheets, Nos. 22 to 25....4¢ @ 4 $\frac{1}{4}$ ¢
Best Bloom Sheets, Nos. 16 to 21....3 $\frac{3}{4}$ ¢ @ 3 $\frac{1}{2}$ ¢
Blue Annealed.....2.8¢ @ 3¢
Best Bloom, Galvanized, discount.....62 $\frac{1}{2}$ ¢
Common, discount.....67 $\frac{1}{2}$ ¢

Merchant Steel.—No change to report. A fair business is being transacted and prices are quite satisfactory. Small lots from store are quoted as follows: Tool Steel, 8 $\frac{1}{2}$ ¢; Machinery, 2.6¢; Crucible Spring, 4 $\frac{1}{2}$ ¢; Open-Hearth Ordinary Spring, 2.7¢ @ 2.9¢; Crucible Machinery, 5¢; Best Sheet Steel, 10¢; Ordinary Sheet, 8¢.

Steel Rails.—There is not much change in this department, and on the whole business is rather disappointing. Sales of small lots are reported at \$29.25 @ \$29.50 at mill, but good-sized orders could be placed at \$29, possibly a shade less if very desirable as to quantity, time of delivery, terms of payment, &c.

Old Rails.—There is an urgent demand, but in the absence of offerings it is impossible to say what the market is. Bids of \$23 for T's were made to-day without bringing any response from holders, so that we quote \$23 nominal.

Scrap Iron.—Under a heavy demand prices are again dearer, with sales at about the following figures: \$20.50 @ \$21 for cargo lots; \$21.50 @ \$22 for carload lots, delivered, or for choice \$22.50 @ \$23; No. 2 do., \$14 @ \$15; Turnings, \$13 @ \$14; Old Steel Rails, \$19 @ \$20; Cast Scrap, \$14 @ \$15; do. Borings, \$9 @ \$10; Old Fish Plates, \$25 @ \$26. Old Car-Wheels, \$17 @ \$18, Philadelphia, or its equivalent.

Wrought Iron Pipe.—There is nothing specially new to note in this department. Orders are coming in very rapidly, and prices show more firmness than for some time past. Discounts are quoted as follows: Black Butt-Welded, 55 ¢; on Galvanized do., 45 ¢; on Black Lap-Welded, 65 ¢; on Galvanized do., 52 $\frac{1}{2}$ ¢; on Boiler Tubes, 60 ¢.

Nails.—The general improvement noted last week continues. Prices are firmly held, and the general outlook is fairly promising. Lots from store are quoted at \$2, with the usual discounts on carload lots.

Chattanooga.

Office of *The Iron Age*, Carter and 9th Sts., CHATTANOOGA, September 10, 1888.

During the past two weeks there has been considerable apprehension that the continuous, and at times heavy, rains would seriously affect the crops of cotton and corn, especially the former; but so far as heard from, the crop is not sufficiently advanced to be much affected. Should the weather become clearer soon there will be no serious damage done and the year will close with one of the largest crops that has ever been raised in the South.

Pig Iron.—Beyond a gradual stiffening-up in prices and increased difficulty in making purchases, there appears to be nothing particular to note in the movements of this article. Furnaces that are not sold up to their entire capacity report no trouble in realizing from \$1 to \$2 more for their output than they did in June and July, and there is considerable anxiety manifested by some consumers in not being able to get contracts for future delivery at present prices, and instances are not wanting that for round lots for time deliveries present prices would be raised, but furnaces are disinclined to commit themselves to contracts to be filled excepting in the near future. Everybody appears to be looking for still higher prices during the present year.

Cincinnati.

CINCINNATI, September 10, 1888.

Pig Iron.—Individual sales of Pig Iron during the past week have been large, although the aggregate volume of business probably has not been much, if any, larger than that of several preceding weeks. A large proportion of the transactions have necessarily been for future delivery, the furnaces being so largely and heavily sold. A very strong tone has prevailed, but no further advance in prices is recorded, many furnaces and their agents deprecating higher prices, on the ground that any further advance will soon lead to increased cost of production by an advance in the price of Ore, Coke, &c., if not labor. At the same time, many furnaces, apparently, wish to encourage the belief in higher prices by not withdrawing decidedly from the market, but pricing their output at such figures as they think may discourage consumers temporarily, and at the same time may keep a buyer in view. The sales of the week have embraced the entire lots of Northern and Southern Irons obtainable, but probably more largely of Southern Ohio Forge Iron, one transaction noted being about 6000 tons for delivery extending through the remainder of the year; 1000 tons Southern Car-Wheel Iron was sold at \$25, four months' time, and several lots of 1000 tons and more of both Forge and Foundry at the range of prices quoted last week. The following are the approximate quotations for the local market, cash, f.o.b. Cincinnati:

Hot-Blast Foundry.

Southern Coke, No. 1.....	\$17.50 @	\$18.50
Southern Coke, No. 2.....	16.50 @	17.50
Southern Coke, No. 3.....	15.50 @	16.00
Ohio Soft Stone Coal, No. 1.....	17.00 @	17.50
Ohio Soft Stone Coal, No. 2.....	15.50 @	16.00
Mahoning and Shenango Valley ..	17.50 @	18.50
Hanging Rock Charcoal, No. 1....	20.50 @	22.50
Hanging Rock Charcoal, No. 2....	19.50 @	22.00
Tennessee and Alabama Charcoal,		
No. 1.....	18.50 @	19.50
Tennessee and Alabama Charcoal,		
No. 2.....	17.00 @	18.00

Forge.

Strong Neutral Coke.....	14.75 @	15.00
Mottled Neutral Coke.....	13.50 @	13.75
No. 1. Mill Coke.....	15.00 @	15.25
No. 2 Mill Coke.....	14.50 @	14.75

Car-Wheel and Malleable Irons.

Southern Car-Wheel.....	20.00 @	23.00
Hanging Rock, Cold Blast.....	22.00 @	25.00
Lake Superior Car-Wheel and Mal-		
leable.....	20.50 @	21.50

Manufactured Iron.—There has been a fair volume of business and a stronger feeling in sympathy with the strong market for Pig Iron, but prices are without change of importance. Common Bar Iron, 1.90¢; Charcoal Bar Iron, 2.90¢ @ 3¢; Sheet Iron, Boiled, Nos. 10 to 27, 2.50¢ @ 3.25¢; Sheet Iron, Charcoal, Nos. 15 to 25, 3½¢ @ 4½¢ @ lb.

Nails.—There has been a moderate demand and a steady market, but the supply is liberal of most sizes. Jobbing prices are based upon 12d @ 40d, which sell at \$2 @ keg, with 10¢ rebate in carload lots, at mills. Steel Nails sell at \$2 and Steel Wire Nails at \$2.65 @ \$2.75 @ keg

Detroit.

WILLIAM F. JARVIS & Co., under date of September 10, report as follows: The market continues active and very strong. Several large sales of Lake Superior Charcoal have been made during the week at from 50¢ to \$1 @ ton higher than ruling prices in July and August. The majority of the Mahoning Valley furnaces are refusing orders unless at \$1 @ ton advance, and some are not in position to fill orders promptly even if price is satisfactory. Silvery Irons have been the slowest in putting up their prices, but they too have finally decided to ask an advance of 50¢ @ ton. The fact that several parties have been seeking Iron for speculative purposes and made some few purchases, has strengthened the market, and very little, if any, Iron is now to be found at less than regular prices. With a strong market we quote as follows:

Lake Superior Charcoal, all numbers	\$20.00 @ \$20.50
Lake Superior Coke, all ore	19.75 @ 20.25
Lake Superior Coke, cinder mixed	18.50 @ 19.00
Standard Ohio Black Band	19.75 @ 20.25
Southern No. 2	17.75 @ 18.25
Southern Silvery	17.00 @ 17.50
Southern Gray Forge	18.25 @ 18.75
Jackson County (Ohio) Silvery	18.50 @ 19.00
Old Wheels	20.00 @ 20.50

Cleveland.

CLEVELAND, September 10, 1888.

Iron Ore.—If the mine owners could be guaranteed a sufficient advance in the price of ore to cover the increased cost of lake transportation, arrangements would undoubtedly be made for a heavier output than is now contemplated. The demand for ore unquestionably warrants an increase in mining operations, but quotations do not keep pace with the demand. Furnacemen seem disinclined to pay much more money for ore than has been paid for the bulk of their season's purchases. A number of buyers are known to have declined offers for ore with full cost of lake freights included. The efforts of the mine owners seem to be directed just at present to an effort to keep pace with the advancing lake freights. But while the cost of transportation is about 50 ¢ @ ton greater than at the beginning of the season, quotations for ore have advanced only from 20¢ to 40¢ @ ton, a very few high grade ores having increased in value 50¢ @ ton. Scattering sales of Gogebic Bessemer at \$3.25 are reported, and additional transactions in No. 1 Specular and Magnetic ores at \$6.25 have occurred. The lake shipments to date are slightly in excess of 2,900,000 tons. Up to a corresponding period last year 3,150,000 tons had been shipped.

Pig Iron.—The demand for all brands of Pig Iron continues in excess of the production. Prices have also improved, Foundry and Bessemer Irons being especially strong. Mill Irons are quoted at an advance, the inquiry even at the higher figures being quite heavy. Sales of Mill Iron at \$16, of No. 1 Foundry at \$17.50, and No. 2 Foundry at \$16.75 are reported.

Manufactured Iron.—Bar Iron in round lots brings \$1.65, a sale of 1200 tons at that figure having occurred during the week.

Sheets.—No. 24 is now quoted at \$2.85. Common Sheets are hard to obtain and cannot be purchased for delivery within 30 days.

Scrap Iron.—Old American Rails have suddenly advanced to \$25 per ton, at which figures they are firmly held. Wrought Scrap is eagerly taken at \$19 @ \$19.50.

Louisville.

LOUISVILLE, KY., September 10, 1888.

Pig Iron.—Business during the past week has been fair, and buyers have been compelled to pay market prices, furnaces not finding it necessary to make concessions at all. There is a feeling among buyers that the coming week will decide whether the market is to decline or another advance be made, and that the position of the Eastern market will largely decide this. Furnaces consider this question already settled, as they report an advance as having already taken place in that section, and that Iron cannot be sold East that will net them more money than the West offers. If this improvement is permanent buyers here will find it to their interest to make purchases at once, as indications point to a slight advance in the immediate future.

Southern Coke, No. 1 Foundry	\$17.00 @ \$18.00
" No. 2 "	16.00 @ 16.50
" No. 2½ "	15.50 @ 16.00
Hanging Rock Coke, No. 1 Foundry	17.25 @ 17.75
Hanging Rock Charcoal, No. 1 Foundry	21.00 @ 23.25
Southern Charcoal, No. 1 Foundry	18.00 @ 18.50
Silver Gray, different grades	14.50 @ 15.25
Southern Coke, No. 1 Mill, Neutral	14.75 @ 15.25
" No. 2 "	13.75 @ 14.75
" No. 1 " Cold Short	14.25 @ 14.75
" Charcoal, No. 1 Mill	15.75 @ 16.50
White and Mottled, different grades	13.50 @ 13.75
Southern Car-Wheel, standard brands	23.00 @ 24.00
Southern Car-Wheel, other brands	19.25 @ 21.25
Hanging Rock, Cold Blast	22.25 @ 25.25
Hanging Rock, Warm Blast	19.25 @ 20.25

Old Rails.—are stronger, sales having been made at \$23 and \$23.25, f.o.b. cars Louisville, and offers on basis of these figures have been made for large amounts to be delivered during the remainder of the year.

New York.

Office of The Iron Age, 66 and 68 Duane street. NEW YORK, September 12, 1888.

American Pig.—The feeling among producers and dealers is growing more and more hopeful, and some sellers claim to be getting an advance of about 50¢ a ton, especially on choice No. 1 Foundry Irons. Still, the Thomas Iron Company are selling quite freely at the old figures, Mr. B. G. Clarke reporting sales in blocks of 1000 and 2000 tons, or 8000 tons during the week. He estimates that of this year's probable output of the company about 20,000 tons still remain unsold. Comparatively little is heard of Southern Irons, representatives of producers here stating that their principals are doing better in the West. From that quarter, however, come reports that the Eastern market is relatively the most favorable to Southern furnacemen. These conflicting claims have been the subject of some comment in the trade of late, though they are by no means a new feature. In Mill Irons New York has long ceased to be a market of any consequence, but it is a feature worthy of note that inquiries for a 1000-ton lot have come here from Pittsburgh during the past week. We quote standard Northern No. 1 Foundry, \$18 @ \$19, the latter for choice quality; No. 2, \$17 @ \$17.50, and Gray Forge, \$15.75 @ \$16.25. Our monthly furnace report, published elsewhere, shows little change among the

Anthracite furnaces, but an increase in the Coke furnace capacity of about 6000 tons weekly.

Scotch Iron.—There has been a continuance of the advance, due chiefly to a rise from 4/ to 10/ in steamer freights, which, it is surmised, is due to an agreement between the two lines. On the rise importers have sold freely, and they are asking for Coltness from \$21 to \$22, Shotts, \$20 to \$20.50, Langloan and Dalmellington, \$19.75 to \$20, it being claimed by some that the lower figures named do not cover cost of importation. It remains to be seen to what extent these prices will curtail consumption. Founders in the West have long learned to get along without foreign Scotch, and it would appear that the time has arrived when even those in the East most persistently clinging to time honored mixtures should make efforts to make themselves independent of foreign Iron.

Structural Iron.—The trade is moderately active and the outlook is regarded as flourishing, but as yet no quotable advances have taken place. We quote for round lots, on dock: Sheared Plates, 2¢ @ 2.10¢; Universal Mill Plates, 2.1¢ @ 2.15¢; Angles, 2.1¢ @ 2.15¢; Tees, 2.5¢ @ 2.7¢ and Channels and Beams, 3.3¢.

Plates.—A moderate amount of business is reported, with a firmer feeling prevailing, Western sellers, particularly, dwelling upon the advance in Raw Materials. We quote for round lots, on dock: Iron Tank, 2¢ @ 2.10¢; Shell, 2.25¢ @ 2.4¢; Steel Tank, 2.25¢ @ 2.3¢; Shell, 2.4¢ @ 2.5¢; Flange, 2.65¢ @ 3¢, and Fire-Box, 3.5¢ @ 4¢. Galvanized Sheets are 65 ¢ @ 65 and 5 ¢.

Steel Rails.—The only sale of any magnitude reported by Eastern mills is a lot of 8000 tons to a Southern road, at private terms. The condition of the market remains practically what it has been for some time past, and no movement of winter work has yet taken place. The sales by all the mills during August are reported to have aggregated about 72,000 tons, bringing the total to September 1st up to about 1,060,000 tons, and leaving about 200,000 tons of the allotment still to be sold, while the deliveries up to September 1st were about 824,000 tons. It is worthy of note that reports from England indicate that the old International Rail Association has now been revived. This practically means that the English, French, German and Belgian mills have parceled out the world's markets with the exception of our own. Representatives of foreign mills in this country profess that they are not yet advised of the conclusion of the negotiations, which, it is well known, have been pending for some time. The fact may be recalled in this connection that one of the severest blows the old syndicate suffered was the capture of a Canadian order by an American mill at a time when domestic competition had driven prices in this country to their lowest point. We continue to quote \$28.50 @ \$29 at Eastern mill.

Wire Rods.—What inquiries are in the market are claimed by importers to be coupled with prices which they cannot think of accepting, especially in view of the rise in freights, which are quoted 10/6 @ 11/. This more than neutralizes the lowering of the foreign prices, which are on the basis of 103/ @ 104/, f.o.b. shipping ports, 97 marks dutiable value. We quote \$39.50 @ \$39.75

Old Rails.—Orders for Old Rails, both for consumers and on speculative account, are numerous but cannot be filled, since holders ask prices which buyers have not yet approached. They ask \$24 @ \$24.50 for Tees and \$24.50 @ \$25 for Double Heads, and even at these figures they are not offered firm. For shipment \$25 is the

best that can be done, inquiries sent abroad for a 2000-ton lot not even having met with a response. It is reported that \$25 has been bid for 2000 tons Tees delivered West, and has been declined. The New Haven Railroad is asking for bids on a lot of 1000 tons of Tees, delivered at New Haven or Bridgeport, the bids to be opened on the 15th inst.

Scrap.—During the past two weeks an active business has been done and the bulk of the stock in the smaller yards has been exhausted at prices ranging from \$18.50 to \$19. Since then a lot of 500 tons has been sold at private terms, and an order for 600 tons is now in the market. The larger yards ask from \$20 to \$21 now.

Fastenings.—The market is fairly active and firm with Spikes selling at \$2.15 @ \$2.20, and Angles at 2¢ @ 2.05¢. The Ames works at Jersey City are to be started again. Dilworth, Porter & Co. are still idle.

Axles.—We quote 2.15¢ @ 2.30¢ for Scrap Axles and 2.4¢ @ 2.5¢ for Muck Bar Axles.

Coal Market.

The Anthracite Coal market is quiet compared with the high-pressure times that preceded the recent advance. Nevertheless a large business is in progress, and the means of transportation are taxed to their full limit in forwarding Coal from the mines and in filling orders received previous to September 1. There is not the same eagerness manifested in placing orders at the new schedule rates, and it is not expected that the business of the present month will be equal in volume to that of August, which is already recognized as the banner month in the history of the trade, but it is possible that cold weather will act as a healthy stimulus. Prices, it is claimed, are held with little or no concession, some of the companies being already pledged for an amount of Coal equal to their entire production for the rest of the month, and therefore decline to assume new obligations. Fortunately for manufacturers the small steam sizes are in excessive supply, and buyers are in a position to dictate their own terms. New York prices are as follows:

	Broken.	Egg.	Stove.	C'nut.
Hard white ash ..	\$4.15	\$4.40	\$4.65	\$4.55
Free white ash....	3.95	4.30	4.65	4.55

Production at the mines is again on the ascending scale, the total for the week ending September 8 being 881,802 tons, a figure rarely surpassed. Compared with the previous week this is a gain of 37,000 tons, and, compared with the corresponding week last year, 153,000 tons. The gain is almost entirely from the Lehigh region. Since January 1 the aggregate is 24,858,891 tons, an increase of nearly 1,500,000 tons, compared with 1887. The Philadelphia *Inquirer* says the total for 1888 will be about 36,000,000 tons, or more than double the output ten years ago: The output for several weeks past is as follows:

	Tons.
Week ended August 4.....	754,883
Week ended August 11.....	831,615
Week ended August 18.....	920,922
Week ended August 25.....	832,058
Week ended September 1.....	844,665
Week ended September 8.....	881,802

The Reading's Monitor Colliery was seriously damaged last week by an explosion, and a serious mine fire broke out in one of Pardee Brothers' collieries, near Hazleton. The New York, Ontario and Western Railroad is about to connect the Coal mines at Carbondale with its line at Hancock, and it is said that the Delaware and Hudson Canal Company alone will send 750,000 tons of Coal annually over the road.

The Bituminous Coal trade is fairly active and prices are sometimes cut as a

consequence of free receipts. Shipments from the Cumberland region for the week were 76,776 tons, and since January 1, 2,341,339 tons, an increase of about 250,000 tons, compared with 1887.

Financial.

Advices from all quarters indicate a steady improvement in all the conditions affecting trade, and an active movement in the distribution of merchandise has fairly commenced. The speculative markets are unusually sensitive and almost without exception are higher. Wheat, cotton, sugar, lard and coffee are all up. Petroleum is strengthened by the formation of a pool to control production. Sluggishness in provisions is attributed to restricted markets, caused by yellow fever in the South. Local jobbers in the grocery trade notice an excellent demand from interior points, and the dry goods jobbing trade report a large business in progress, here and throughout the country, characteristic of what may prove to be the banner week. Of trade in the West a Chicago contemporary says the recent marked improvement is fully sustained and confidence in the future is unabated. Another says: "The summer has closed with the preponderating influences more favorable to commercial prosperity than at any time since the close of May. Tendencies, indications and prospects are construed by thoughtful, intelligent business men to mean prosperity." The unusually large corn crop, much of which is already being harvested, is generally recognized as the basis of the confident tone prevailing in trading circles. The railroads, it is predicted, will have their carrying capacity fully taxed during the next few months, but the fierce rivalry of competing lines may prevent their taking full advantage of an opportunity to increase their revenues. East of Chicago the lines, it is believed, have no ability to maintain uniform rates.

The Stock Exchange markets have been active and irregular, but generally firm. On Thursday it appeared that the three weeks' rise in prices had come to a halt, but on Friday there was a rally on the report that differences between the shippers and the Iowa companies would be arranged. On Saturday there was another upward movement, the closing sales showing considerable gains during the week. The bank statement caused a slight sensation. On Monday there were rumors from the West of further interference with established rate tariffs by State commissioners, and the decreased earnings of the Atchison road had some effect. Coal stocks reached the highest point of the year, Lackawanna the highest in six years.

United States bonds are quoted as follows:

U. S. 4½s, 1891, registered	109¾
U. S. 4½s, 1891, coupon.....	109¾
U. S. 4s, 1907, registered	129¾
U. S. 4s, 1907, coupon.....	129¾
U. S. currency 6s.....	121

The weekly bank statement reflected the large drafts upon their funds in moving the Western crops, their reserves showing a loss of \$4,920,500. The surplus now stands at \$11,846,425, which is still much larger than at the same time last year. Loans increased \$1,008,200, specie decreased \$3,941,700, legal tenders decreased \$2,168,900, and deposits decreased \$4,760,400, and there was a slight hardening in the rates for money. Time loans were made chiefly by out of town institutions at 3 @ 3½ % on collaterals for three months, and 4 @ 5 % for longer dates. The failures of the week include the old firm Charles Vogt & Co., importers of china and glassware.

The Secretary of the Treasury purchased \$4,000,000 of the registered 4 % at 129, and \$2,150,000 of the 4½ % at 106¾. These are

prices fully ¼¢ above the market prices of the previous week. Since April 21 there have been purchased of 4 % \$27,273,250, and of 4½ % \$12,744,300; total \$40,017,550. Although a contraction of \$27,700,000 has occurred during the past 12 months in the national bank note circulation, only \$11,800,000 of this amount has been due to the withdrawal of bonds deposited with the Treasury as security, showing that the banks reluctantly part with their bonds.

Sterling exchange is dull and steady at \$4.85½ @ \$4.88½.

The Government crop report was an important factor in the speculative markets and was immediately felt. Winter wheat turns out rather better than had been expected, and spring wheat somewhat worse. The percentage for the whole crop is 77.3, which the most careful estimate as representing 413,000,000 bushels, against 418,000,000 bushels last month. Spot wheat and spot corn dropped about ¼¢ @ ½¢, and new crop grades of flour were 5¢ @ 10¢ per barrel lower than on Saturday. Wheat was again off on Tuesday 1½ @ 2¢. The report made the average of cotton 83.8, a condition more favorable than was expected, and spots were firm at 1½¢ advance. Corn was stronger on an unusually good export demand. Wheat exports are restricted by lack of cargo space and the recent extraordinary advance in ocean rates, equal to 10¢ @ 11¢ per bushel.

The imports and exports at New York for August alike show a falling-off compared with last year. The former amounts to \$35,736,829 or \$8,500,000 less in merchandise and \$5,500,000 less in specie than for the month of August last year. The exports for the month amounted to \$26,127,098 or \$3,603,239 less than during August last year. High rates for ocean tonnage and enhanced cost of the leading export staples account in part for the difference. For eight months the exports exclusive of specie amount to \$192,912,000, a decline of nearly \$11,000,000 compared with the same time in 1887. Owing to the lessened imports the unfavorable balance of trade for the entire country reported for the first seven months—viz., \$55,500,000—will be reduced several millions by the August statements.

According to the Custom House report the exports of specie from this port for the week amounted to \$211,000, and the imports were \$171,000. Since January 1 the totals are \$27,146,000 and \$6,000,000 respectively. The imports of merchandise at this port during the week amounted to \$7,816,000, of which \$2,500,000 represents dry goods, and the aggregate since January 1 is \$324,288,000, as compared with \$325,958,000 for the same time last year and \$302,011,000 in 1886.

Imports.

The imports of Iron and Steel, Hardware, &c., at this port from August 31 to September 6, inclusive, and from January 1 to September 6, inclusive, were as follows:

Iron and Steel.

	Aug. 31 to Sept. 6, Tons.	Jan. 1 to Sept. 6, Tons.
Pig Iron: N. S. Bartlett.....	300	4,100
James Williamson & Co.....	300	3,800
Naylor & Co.....	180	6,164
G. W. Stetson & Co.....	100	12,050
Pratt, W. & Co.....	10	10
Spiegelstein, Crocker Bros....	104	3,521
Naylor & Co.....	100	6,919
Geisenheimer & Co.....	65	135
Steel: J. Abbott & Co.....	75	440
W. F. Wagner.....	18	1,083
M. Cohn & Co.....	12	190
F. S. Pidditch.....	9	321
J. S. Leong's Son & Co.....	8	8
G. Lundberg.....	5	106½
Chas. Huggill.....	5	21½
C. F. Boker.....	3	175½
A. R. Whitney & Co.....	2	2

Steel Rods: Dana & Co.	500	2,550
Naylor & Co.	498	14,755
J. A. Roebbing's Sons.	54	1,259
Pierson & Co.	21	21
Cary & Moen.	10	660
R. H. Wolff & Co.	4	2,091
Steel Sheets: R. Crooks & Co.	23	313
Pierson & Co.	12	848
Naylor & Co.	5	473
Steel Bars: Naylor & Co.	1	372
Steel Forgings: Thos. Prosser & Son.	50	3,498½
Steel Crop Ends: Naylor & Co.	419	2,359
Steel Rails: Delaware, L. and W. R. Co.	54	202
Iron: J. Abbott & Co.	100	6,663½
J. S. Leng's Sons & Co.	2	2
R. F. Downing & Co.	1	105
Rivet Rods: J. Abbott & Co.	226	3,255
Naylor & Co.	100	371
A. Milne & Co.	6	310
Wire Rods: J. A. Roebbing's Sons.	63	149
Iron Rods: R. F. Downing & Co.	55	55
Swedish Bar Iron: C. v. Philip	40	128
Sheet Iron: T. B. Coddington & Co.	53	1,038
Swedish Wire Rods: C. v. Philip	1	4
Swedish Rough Bars: C. v. Philip	1	1
Charcoal Iron: A. Milne & Co.	41	56
Iron Girders: W. H. Wallace & Co.	86	295
Oil Bbl. Hoops: A. R. Whitney & Co.	100	300
Cotton Ties: Bullard & W.	300	945
J. S. Leng's Son & Co.	125	285

Tin Plates.

	Boxes.	Boxes.
Phelps, Dodge & Co.	12,356	375,367
A. A. Thomsen & Co.	8,207	89,772
Dickerson, Van Dusen & Co.	7,219	190,358
Pratt Mfg. Co.	3,805	124,459
T. B. Coddington & Co.	3,673	122,313
N. L. Cort & Co.	2,754	75,039
Bruce & Cook	2,678	72,700
Central Stamping Co.	2,073	24,050
G. B. Morewood & Co.	1,750	33,689
S. Shepard & Co.	1,718	15,653
R. Crooks & Co.	1,580	49,441
H. R. Demilt & Co.	805	15,124
Lalanc & G. Mfg. Co.	432	3,810
E. S. Wheeler & Co.	331	4,984
Somers Bros.	140	440
Merchant & Co.	129	16,612

Metals.

	Pounds.	Pounds.
Tin: Phelps, Dodge & Co.	149,003	1,483,917
D. Thomsen & Co.	22,435	181,458
Spelter: American Metal Co	56,000	554,163

Hardware, Machinery, &c.

Boker, Hermann & Co., Mdse., cs., 7; Hdw., cs., 13; Arms, cs., 31	
Central Gas Light Company, Ironwork, pkgs., 71	
Downs, Wm., Mach'y, cs., 8	
Downing, C. H., Mach'y, cse., 1	
Field, Alfred & Co., Mdse., cs., 33; Hdw., cs., 13; do., cask, 1; Anvils, 46	
Folsom, H. & D., Arms, cs., 4	
Graef Cutlery Company, Cutlery, cs., 17	
Hartley & Graham, Guns, cs., 2	
Lare, J. H. & Co., Arms, cs., 18	
Merentia, T. & Co., Hdw., cks., 26; Nails, kegs, 100	
Pliditch, F. L., Hdw., box	
Schoverling, A., Arms, cs., 12	
Shoverling, Daly & Gales, Arms, cs., 11	
Survill, J. L., Hdw., cks., 4; Nails, kegs, 26	
Sellers, W. B., Mdse., cs., 3	
Thornton, J. & Co., Hdw., cse., 1	
Tryon, E. K. Jr., Mdse., cs., 12	
Ward, W. H. & Co., Mach'y, cs., 36	
Wiebusch & Hilger, Lim., Mdse., cs., 13; Hdw., Order: Hdw., cs., 2; ditto, cks., 2; Mach'y, pkgs., 8	

Exports of Metals.

	August 31. to Sept. 6. Pounds.	Jan. 1. to Sept. 6. Pounds.
Copper: J. Abbott & Co.	10,053,619	3,129,022
Lewisohn Bros.	2,581,293	5,148,985
F. A. Lomal	223,359	112,000
American Metal Company	5,148,985	500,000
G. H. Nichols	112,000	110,276
B. Bruce Ismay	430,000	224,034
S. Mendel	112,000	112,025
Ledoux & Co.	112,000	1,250
Muller, Schall & Co.	112,000	449,881
Copper Queen Con. M. Company	140,000	962,190
J. Kennedy, Tod & Co.	206,250	112,000
H. Becker & Co.	112,000	250,000
Orford C. & S. Rtg. Company	112,000	6,250
Thos. J. Pope, Sons & Co.	112,000	189,081
J. Parsons & Co.	112,000	4,000
Bridgport Copper Company	1,000	1,000
C. Herold	34,382,398	3,021,610
Phelps Bros.	3,021,610	2,506,873
R. W. Jones	2,506,873	295,000
W. H. Crossman & Bro.	295,000	485,800
R. Crooks & Co.	485,800	184,288
Copper Matte: Williams & Terhune	184,288	722,777
Lewisohn Bros.	722,777	180,905
American Metal Company	180,905	41,652
J. Abbott & Co.	41,652	560,574
C. Ledoux & Co.	560,574	
F. W. J. Hurst		
G. H. Nichols		
H. T. Nichols & Co.		
Kunhardt & Co.		
Old Copper: Burgess & Co.	5,708	

Metal Market.

Copper.—While spot Chili Bars have been active in London during the week, advancing from £95 to £105 in consequence of the covering of shorts, but receding this morning to £95, futures have remained unaltered at £79; good merchantable brands gave way from £76. 10/ to £76. 5/, and Best Selected is now £79. 10/. The total sales, 700 tons. Here, 100,000 lb were sold at 17¢ @ 17½¢, September; 16.85¢, November, and 16.95¢, @ 17.10¢; December. A cable message from Paris states that M. Secrétan merely wanted to give the bears a lesson and that he prefers to see the price of Chili Bars £80 @ £85, so as to encourage consumption. It is also reasserted that he contemplates the extension of contracts with Spanish producers for six years. About an extension with our mines nothing is mentioned so far. From Boston it is intimated that another sale to our manufacturers may take place a couple of weeks from now. The Boston Transcript figures the total product of the eight largest Lake Superior Copper mines for August at 4826 tons of mineral, against 2758 tons for the same month last year, and the total product for eight months this year at 32,945 tons, against 30,301 tons last year. It adds: This product for eight months is equal to fully 51,500,000 lb of Fine Copper, on which the net profit over all expenses must have been \$3,250,000. Import of Copper into Liverpool and South Wales during the first eight months, 18,014 tons Fine, against 7512 last year. Export of Pyrites from Spain during the first six months, 418,720 tons, against 403,061 last year and 358,386 in 1886; of Precipitate, 13,541, against 13,745 and 13,396. Rio Tinto rose 21 francs in Paris last week. Spot Copper closes in New York at 17¢ @ 17½¢ to-day.

Tin.—Spot Tin rose in London since our last report from £98 to £104, and gave away again this morning to £103. 10/, while futures advanced from £98. 15/ to £104. 10/, to recede to £104 this morning, sales, 1300 tons. This advance, being altogether speculative, has met with but little response here, as it is believed it will prove evanescent, and sales were restricted to 10 tons spot at 22.35¢; 105 tons October at 22¢ @ 22.65¢; 25 tons ditto at 22.90¢ and 10 tons September at 23¢, the spot price to-day being 23¢ @ 23½¢. Shipments from the Straits Settlements to the United States during the first six months have been 13,377 piculs, against 43,075 in 1887, 31,533 in 1886, 16,051 in 1885, 26,651 in 1884 and 52,480 in 1883. **Tin Plates.**—Have been more active and firmer on the spot, the scarcity in Coke Tins continuing, whereas Ternese are comparatively plentiful. Futures are in request and from 5¢ to 10¢ @ box higher. Liverpool has advanced with Cokes from 13/6 to 14/. We quote toward the close, large lines, @ box, on the spot: Siemens-Martin Steel, Charcoal finish, \$4.85 @ \$5.25; Coke finish, \$4.75; Ternese, \$4.30 @ \$4.40; Bessemer Cokes, \$4.60 @ \$4.65, and Wasters, \$4.20 @ \$4.25.

Lead.—On the Metal Exchange 894 tons of Lead were sold since our last report, all the way to 5.02½¢, but nothing transpired in the way of sales to consumers, who keep aloof as heretofore, not feeling disposed or compelled to operate while this speculative purchasing continues. The chief operator is said to hold 15,000 tons at present. The closing spot price for Common Domestic to-day is 5¢; at St. Louis the price is firm at 4.80¢ @ 4.55¢. The London quotation for Soft Spanish remains £14. 2/6, and for English Pig it is £14. 5/. Spanish exportation of Lead during the first six months has been 65,040 tons, against 66,349 tons last year and 54,779 tons in 1886.

Spelter.—Ore continues advancing in the West, where Best Blende was worth last week \$29 ¾ ton, and will be raised to \$30 this week. The price here for Common Domestic is now 5½¢ @ 5¼¢, with little doing, and Silesian cannot be laid down for less than 5.80¢, since it improved in London to £18. 10/. The outlook both here and in Europe is a remarkably strong one. Spanish exportation of Calamine the first six months has been 16,601 tons, against 17,684 last year and 18,217 in 1886.

Antimony.—Has been only moderately active at 13¢ Cookson and 9½¢ Hallett; the latter is £38 in London.

New York Metal Exchange.

The following sales are reported:

THURSDAY, September 6.	
16 tons Lead, October.	4.97½¢
10 tons Tin, spot.	22.35¢
25,000 lb Copper, December.	16.95¢
25,000 lb Copper, November.	16.85¢
FRIDAY, September 7.	
16 tons Lead, October.	5.00¢
10 tons Tin, October.	22.60¢
10 tons Tin, October.	22.65¢
100 tons Lead, October.	5.00¢
10 tons Tin, October.	22.60¢
SATURDAY, September 8.	
100 tons Lead, September.	5.00¢
25,000 lb Copper, September.	17.00¢
200 tons Lead, October.	4.97½¢
100 tons Lead, October.	5.00¢
MONDAY, September 10.	
16 tons Lead, September.	5.05¢
32 tons Lead, September.	5.05¢
50 tons Lead, October.	5.05¢
25 tons Tin, October.	22.90¢
TUESDAY, September 11.	
10 tons Tin, spot.	23.00¢
25,000 lb Copper, September.	16.85¢
32 tons Lead, October.	5.02½¢
200 tons Lead, October.	5.00¢
48 tons Lead, November.	4.60¢
Add N Y Metal Exchange	
WEDNESDAY, September 12.	
25,000 lbs. Lake Copper, December.	17.05¢
25,000 lbs. Lake Copper, December.	17.10¢

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]
LONDON, WEDNESDAY, Sept. 12, 1888.

There have been no really new developments in the market for Chili Bars or other Copper. Cash warrants are still kept at an extravagant point for the purpose apparently of squeezing the "shorts," but consumers can purchase supplies as cheaply now as they could a fortnight ago, and futures are no higher than last week, despite the further rise of £10 on prompts. Supplies are constantly increasing under heavy deliveries by the mining companies and the movement into the channels of consumption is very much restricted. The August deliveries to consumers were the smallest for any month in several years, and purchases at the present time are running light. G. M. B. contracts are still given good support by the syndicate, but do not appear to be traded in as freely as heretofore.

The speculative activity in Block Tin has been more prominent this week than last, and seems to be governed by the same influences that forced prices up previously. Shipments from the Straits are considerably heavier than for some time past, but neither that fact nor the probability of cost checking the consumption has any perceptible influence upon the operators for a rise. The advance for the week is about £6.

Tin Plate makers are more disinclined now than formerly to book orders except at higher prices, in view of the condition of the market for crude materials and Block Tin. The principal makers have

orders on their books that will keep them busy for some time to come. The Tynewydd Works, Pontnewydd, operating two mills, and formerly owned by E. Stanford & Co., have changed hands. The stock of Plates at all British shipping ports is 199,000 boxes, against 118,000 boxes a year ago. The British Board of Trade returns show total exports to the United States last month of 28,500 tons, against 27,450 tons in July.

The market for Scotch warrants and for makers' brands continues very strong. The latter derive no inconsiderable support from continued improvement in the sales to consumers, and the latter fact, coupled with covering of oversold account, has served to move warrants still higher. Stimulated by the active business, makers are putting more furnaces into blast. The upward movement of ocean freight rates, it is feared, will have an unfavorable influence upon export trade. It is stated that the numerous American orders at hand last week could not be filled, owing to the advance of prices of Iron and rates of freight. The exports of Pig Iron to the United States during August were only 10,000 tons, against 36,000 tons last year. The total is about the same as that for July.

There is a fairly active demand for Steel Rails, and prices continue to harden in view of the heavy orders booked latterly and the condition of the market for crude materials. The reports of an alleged combination being formed to sell at fixed rates are denied.

The demand for Old Iron Rails has further increased the past week and prices continue to harden, but show no further positive advance.

Scotch Pig.—The market continues strong and active, with a further advance in some brands:

No. 1 Coltness, f.o.b. Glasgow	50/
No. 1 Summerlee, " "	51/
No. 1 Gartsherrie, " "	47/6
No. 1 Langloan, " "	47/6
No. 1 Carnbroe, " "	43/6
No. 1 Shotts, " at Leith	47/6
No. 1 Glengarnock, " Ardrossan	45/3
No. 1 Dalmeilington, " "	43/
No. 1 Eglinton, " "	42/
Steamer freights, Glasgow to New York, 10/	
Liverpool to New York, 10/.	

Cleveland Pig.—Trade has continued active, and prices are again higher. No. 1 Middlesboro', G.M.B., 37/6 @ 38/; No. 3 do., 35/ @ 35/6.

Bessemer Pig.—The market strong at last week's advance and quite active. West Coast brands, mixed numbers, 45/6, f.o.b. shipping point.

Spiegeleisen.—Demand is running light. Prices barely steady. English 20% quoted 75/, f.o.b. N. W. England shipping point.

Steel Rails.—There has been a larger business at firm prices. Standard sections quoted at £3. 18/9, f.o.b. at N. W. England shipping point.

Steel Blooms.—The demand very fair and prices steady. We quote £3.15/ for 7 x 7, f.o.b. at N. W. England shipping point.

Steel Billets.—A moderately active business in these at firm prices. Bessemer, 2½ x 2½ inch, £4, f.o.b. at N. W. England shipping point.

Steel Wire Rods.—The demand slow but prices held steady. Mild Steel No. 6 quoted at £5. 18/9 and No. 5 at £5. 25/, f.o.b. at N. W. England shipping point.

Steel Slabs.—Very little doing and prices nominal. Bessemer, £3. 17/6, f.o.b. at N. W. England shipping point.

Old Rails.—Market very firm with demand good. Tees quoted at £2. 17/6, and Double Heads £3, free on board.

Scrap Iron.—There is a fair business at steady prices. Heavy Wrought quoted at £2. 5/, f.o.b.

Crop Ends.—Sales fair at previous prices. Bessemer quoted £2. 7/6 @ £2. 10/, f.o.b.

Tin Plate.—Makers asking higher prices and offer sparingly. We quote, f.o.b. Liverpool:

IC Charcoal, Allaway grade	15/ @ 15/6
IC Bessemer steel, Coke finish	13/9 @ 14/
IC Siemens	14/ @ 14/3
IC Coke, B. V. grade	13/6 @ 13/9
Charcoal Terne, Dean grade	13/3 @ 13/6

Manufactured Iron.—Business continues active at firm prices. We quote, f.o.b. Liverpool:

Staff. Ord. Marked Bars	2 s. d.	2 s. d.
Common	7 12 6	5 0 0
" B'l'k Sheet, singles	6 15 0	6 15 0
Welsh Bars (f.o.b. Wales)	4 12 6	4 15 0

Tin.—A large business done, and the market strong. Straits quoted at £103. 10/ @ £104, spot, and £104 @ 104. 10/ for three months' futures.

Copper.—Spot Chili Bars irregular. Otherwise market firm, but quiet.. Chili Bars, £95 @ £100, spot, and £79 three months' futures. Best Selected, £79.

Lead.—There has been a good business, and the market is strong. Soft Spanish, £14. 2/6.

Spelter.—Prices again higher and the market strong. Silesian, ordinary, £18. 7/6.

The Thomson-Houston Motors on Street Railroads.

The Thomson-Houston Electric Company have added two new buildings to their present factory at Lynn. At the present time there are 16 roads in operation using the company's system, and the following will give a good idea of the company's new business, roads in process of construction and those just completed. The overhead construction work at Syracuse is now completed and the cars will be in operation very soon. The road is four miles in length, and will have eight cars in operation. The Lynn and Boston Street Railway Company have decided to use the Thomson-Houston system for the Highland Line, at Lynn. The road has a large number of curves and grades as high as 9 per cent. The road will be in operation early in September, and will use the single overhead conductor and return rail circuit. The Crossstown Railway Company, of Scranton, Pa., will add four of the improved Thomson-Houston trucks, which will be put in operation this month. Work on the machinery of the Hoosac Valley Street Railway at North Adams, is being rapidly pushed forward. The road will be equipped under the Thomson-Houston system, using the single overhead conductor and return rail circuit. The track is five miles long and six cars will be operated. The Revere Street Railway's track construction was completed August 15, and the electrical work on the 16th, and cars are now running regularly. The Des Moines Broad Gauge Railway Company are to equip their seven and one-half miles of track with the same system and will operate eight cars having the latest improved trucks.

The Suburban Street Railway, of Scranton, received, about two weeks ago, an improved motor truck from the Thomson-Houston Electric Company, and two more will be added very soon. The Omaha and Council Bluffs Railway and Brigid Com-

pany will put in a model road, using the Thomson-Houston system. The overhead construction will be used, and the trucks containing all the latest improvements. This road, which is two miles long and on which four cars will be operated, will be one of the finest electric railways in the United States. It will be in operation by September 15. The tracks for the electric railroad at Bangor are now being laid. The Street Railway Company have decided to use electricity and have made a contract for a complete equipment. The road will use the single overhead conductor and is two miles long, and will operate 10 cars, each equipped with a 20 horse-power Thomson-Houston motor. The Seattle Electric Railway and Power Company is a corporation in Seattle, Wash. Ter., which is composed of the Seattle Street Railway Company and the West Street, Lake Union and Park Transit Company. These two companies have decided to unite their interests and equip their entire system with electricity, and have contracted with the Thomson-Houston Company for the equipment of their road. The road, which is to be in operation by January 1, is 4½ miles in length, 3500 feet double track, and will operate five cars.

Our Washington correspondent telegraphs that the Senate tariff bill will not be reported for a few days.

Deaths from yellow fever in Jacksonville to date number 90; total number of cases, 684. Some 20,000 people have left the city and it is believed that not more than 4000 whites remain at their homes. New York City is contributing handsomely for the relief of the sufferers. A single individual gives \$12,000.

The Texas State Capitol building at Austin, one of the most costly structures in this country, was erected by a syndicate represented by Senator C. B. Farwell and others, who were entitled to receive as compensation 3,000,000 acres of land. The building is nearly completed, but the State authorities refuse to receive it on account of alleged defects, one of which is leakage in the massive copper dome. Architect Meyers, of Detroit, who furnished the plans says: "The contractor, G. Wilkie, of Chicago, says the dome was to have been built according to the specifications wholly of cast iron, but that changes were permitted which allowed the substitution of thin galvanized iron, cheapening the work and endangering the stability of the building. The State retains 300,000 acres of land as security for the faithful performance of the work and litigation is in prospect."

Thomas H. Hotchkiss, United States Consul at Ottawa, has sent to the State Department a review of the lumber industry of the Ottawa Valley for the past year. The export of pine to the United States from the Ottawa Valley district for 1887 was, for consumption, 227,139,959 feet, valued at \$2,827,234; in bond for export, 33,698,348 feet, valued at \$610,795. The total exports of pine boards and plank from all of Canada during the same year were 508,304,000 feet, valued at \$6,209,023. The exports of pine saw logs to the United States from all of Canada for the same year were 2,869,000 feet, valued at \$24,452. Mr. Hotchkiss says: "The figures of the export lumber trade of Canada with the United States show that if all the lumber sent into the United States from Canada was placed in the Chicago market it would supply but one-fourth of the requirements of that market alone and but one-half of the quantity handled in either Tonawanda or Buffalo."

Hardware.

Business continues to improve, and the volume of trade is now referred to as very satisfactory. Many orders are being received from the smaller trade through the country, and manufacturers and merchants are busy. There has been little change in the general aspect of the market, prices being without important alteration.

Wire Nails.

There has been no important change in the condition of the Western market, the new arrangement into which the manufacturers have entered working satisfactorily and securing the maintenance of prices. The Eastern manufacturers have made a similar advance and agreed upon the same prices as the Western. The regular quotation for small lots is \$2.65 and for carload lots, \$2.55. The market is thus in a decidedly improved condition, and it is hoped that the era of unprofitably low prices will be succeeded by one in which better prices will prevail.

In our issue of the 30th ult. an error occurred in the paragraph relating to Wire Nails, in which the discount was named as 10 per cent. This was so obvious an error that we presume few in the trade were misled by it. The cash discount remains as before at 2 per cent., and a full statement of the terms is as follows: Terms, 60 days' acceptance, or 2 per cent. discount for cash if paid within 10 days from date of bill of lading.

Cut Nails.

A moderate improvement in the demand is noticed in the New York market, but the prices remain unchanged at \$1.85 @ \$1.90 for carload lots on dock, and \$1.90 @ \$1.95 for small lots from store. The tendency in raw material is upward.

Miscellaneous Prices.

Machine Bolts and Bolt Ends are a shade lower in price, and there is some irregularity in the figures named by the different manufacturers.

Strap and T-Hinges are without material alteration in price and are held pretty steadily by the manufacturers. There is, however, a disposition on the part of some of the jobbing houses to offer them at concessions, which in some cases are very near the extreme price at which the goods are purchased by the wholesale trade.

The Cordage market is in a peculiar position, there being some difficulty in obtaining Rope, most of the manufacturers having shut down for want of Hemp. The general tone of the market is accordingly decidedly firm, but there is not entire uniformity in the prices named by the different manufacturers.

At a meeting of the Associated Spring manufacturers, held in Cleveland, 30th ult., an advance was made in the price of Springs. The discount was fixed at 60 and 5 per cent. from standard list, with a rebate of 5 per cent. if \$750 worth is taken in any six months, or a rebate of 10 per cent., instead of 5 per cent., if \$1500 worth is taken in any six months, the terms being four months, or 3 per cent. discount for cash in 30 days, with the usual delivery.

Stove Boards are in a somewhat demoralized condition, and very low prices are ruling. The competition between the manufacturers has been exceedingly animated, and it is claimed that prices are forced down below the line of profit. The trade have been purchasing largely, and it is impossible to obtain goods promptly from some of the leading manufacturers.

D. R. Sperry & Co., of Batavia, Ill., have just issued their twentieth annual price list. It is of pocket size, and contains 35 pages, illustrating and describing their goods, which consist of Caldrons, Sugar Kettles, Laundry Stoves, Farm Boilers, Mauls, Coffee Roasters, Hollow-Ware, and a great variety of miscellaneous goods made of cast iron. Their Chicago salesroom is at 235 Lake street. Their discounts are as follows, terms 90 days, or 8 per cent. if paid within 10 days :

	Per cent. off.
Caldrons, page 13.....	40&5
Caldrons, in lots of 5 or more, if shipped direct from factory.....	45&5
Castings for setting Caldrons, pages 18 and 19.....	40&5
Baker's Oven Castings, page 20.....	40&5
Sugar Kettles, page 16.....	50
Sugar Kettles, in lots of 8 or more, if shipped direct from factory.....	55
Extra Finished Hollow-Ware, pages 24, 25, 26, 27 and 28.....	50
Plain Hollow-Ware (Tea Kettles, Ham Boilers, Long Pans, &c.).....	55
Laundry Stoves, page 9.....	40
The Dairy Maid, pages 10 and 11.....	35
Farm Boilers, pages 4, 5, 6, 7 and 8.....	40
Mauls, page 21.....	60&5
Wood Face Mauls, page 21.....	35
Coffee Roasters, page 23.....	40
Bake Ovens, Improved Covers, page 22.....	50&5
Drug Mortars, page 30.....	30
Felloe Oilers, page 23.....	45
Foundation Gratings, page 23.....	45
Miscellaneous Goods, pages 32, 33 and 34.....	35

The Plumb & Lewis Mfg. Company, Grand Rapids, Mich., have discontinued making the Cottage and Mystic Carpet Sweepers, and have added the Improved Parlor Queen, nickeled and japanned, and the Excelsior. They issue circulars relating to these goods and their line of Wringers, on which prices are named as given below:

Carpet Sweepers.

	Per dozen.
Improved Parlor Queen, nickeled.....	\$27
Improved Parlor Queen, japanned.....	24
Parlor Queen.....	24
Excelsior.....	22
Garland.....	18
Housewife's Delight.....	15

Wringers.

Gem Bench Wringer.....	52
No. 4 Bench Wringer.....	48
No. 5 Bench Wringer.....	45

Pratt & Co., Elmira, N. Y., announce a new Hanger, named the May. It is made entirely of steel, with the exception of the wheels, which are V-shaped for preventing friction. The point is made in regard to it that it cannot be thrown from the track, and other advantages possessed by it are referred to. It is sold at discount 50 and 5 to 50 and 10 per cent.

In our issue, 23d ult., we had occasion to call attention to an error of the compositor in the Alford & Berkele Company's advertisement, in which the discount on IXL Shells was named as 40 and 50 per cent. instead of 40 and 5 per cent., the correct figure. By some inexplicable mistake the advertisement appeared in our last issue with the same erroneous quotation. Fearing that some may have been misled by this repeated error we desire to remind the trade emphatically that the correct discount is 40 and 5 per cent. We much regret the trouble thus caused the company and their customers.

The following price list of the Triumph Wire Chain manufactured by the Bridgeport Chain Company, Bridgeport, Conn., and adapted especially for hanging pictures, is subject to a discount of 40 and 10 per cent. :

Size.	
No. 0, Brass, Lacquered (tensile strength, 125 pounds).....	\$1.75
No. 0, Brass, Nickel-Plated (tensile strength, 125 pounds).....	2.50
No. 1, Brass, Lacquered (tensile strength, 160 pounds).....	2.00
No. 1, Brass, Nickel-Plated (tensile strength, 160 pounds).....	2.75

The following are the prices of the line of Wringers manufactured by the Empire Wringer Company, Auburn, N. Y. The Volunteer and Daisy Wringers are listed

as follows, with an abatement of \$2.50 per dozen from the prices named:

Volunteer Double Cog Wringer.

	Per dozen.
Size 10, Rolls, 10 x 1 1/4.....	\$27.00
Size 11, Rolls, 11 x 1 1/4.....	31.50
Size 12, Rolls, 12 x 1 1/4.....	36.00

The Daisy Wringer.

	Per dozen.
Size 2, Rolls, 10 x 1 1/4.....	\$22.50
Size 4, Rolls, 12 x 1 1/4.....	31.50

The Empire Purchase Gear and Empire Bench Wringers are sold from the following list, net:

The Empire Purchase Gear Wringers.

	Per dozen.
Size 3, Rolls, 10 x 1 1/4.....	\$36
Size 4, Rolls, 11 x 1 1/4.....	48
Clamps for round or set tube, as desired.	
Size 5, Rolls, 12 x 1 1/4.....	60
Size 12 1/2, Rolls, 12 x 1 1/4 (special).....	72
Size 50, Rolls, 12 x 1 1/4 (special).....	63
Size 14, Rolls, 14 x 2 1/4 (crank).....	126
Size 14, Rolls, 14 x 2 1/4 (pulleys).....	162
Size 16, Rolls, 16 x 2 1/4 (pulleys).....	222

Empire Bench Wringers.

	Per dozen.
Size 3, Rolls, 10 x 1 1/4.....	\$51
Size 4, Rolls, 11 x 1 1/4.....	60
Size 5, Rolls, 12 x 1 1/4.....	72

A New Departure.

A movement which has for some time been under consideration, and which is of general interest to the Hardware trade as being in some respects a new departure, has been at last consummated. H. C. Marshall, who has been associated for a number of years with Clement M. Biddle, has been engaged by a number of large wholesale Hardware houses as their resident buyer, his office being at 110 Chambers street, in this city. Leading houses of St. Louis, St. Paul, Chicago, Pittsburgh, Cleveland, Boston, Philadelphia and other points are thus represented. Much of the significance of this syndicate or arrangement is in the fact that these houses are among the very largest in the country, with the exception of the great St. Louis and Chicago jobbers, Hibbard, Spencer, Bartlett & Co., Horton, Gilmore, McWilliams & Co., and Simmons Hardware Company. It will thus be seen that Mr. Marshall represents a number of houses the aggregate of whose purchases will be very large. The object of the arrangement is stated to be to save expense by having a common representative with headquarters in this city, and branch offices in one or two leading manufacturing centers, while at the same time it is anticipated that the aggregate of the orders of these houses will secure them the most advantageous terms in the purchase of their goods. The fact that all the houses thus united in the arrangement for the purchase of their goods are among the largest in the country, and occupy, as nearly as may be, positions of equal prominence, entitling them to the best prices, is referred to as avoiding some of the mischiefs connected with so-called syndicate buying, in which smaller houses sometimes obtain prices to which they are scarcely entitled. Another objection which the manufacturers have felt to arrangements somewhat similar is removed by the fact that in this case the goods purchased by their representative are charged in all cases directly to the several houses, thus permitting the manufacturer to have direct dealings with the parties who handle his goods. It is expected by those interested in this movement that the combination of the orders of these houses will enable them to secure the most favorable terms from manufacturers, lower, it is hoped, in some cases, than can be obtained by any of their competitors, and that at the same time the manufacturers will not regard the movement with especial disfavor, but will be, on the other hand, desirous of securing the orders of these associated concerns.

Export Trade.

The recent mails from Australia are referred to as bringing very satisfactory orders for American goods, and the gradual, and in some markets marked, increase of our business is noted with satisfaction. We give below some data in regard to recent shipments from this port, which will indicate the character of goods which are being sent abroad and the houses through whom they are exported:

PER BRIG WAN BUN, AUGUST 31, FOR CAPE TOWN, AFRICA.

By *W. H. Crossman & Co.*—10 dozen Axes, 2 cases Hardware.
By *Arkell & Douglas*.—1 Refrigerator, 6 dozen Churns, 3 Lawn Mowers.
By *R. W. Forbes & Co.*—47 packages Carriage Woodwork, 2 dozen Forks, 8 dozen Hatchets, 56 dozen Handles, 1 package of Hardware.
By *M. Berliner*.—3 packages Blocks, 53 pounds Twine, 24 Stoves.
By *Henry W. Peabody & Co.*—1120 pounds Rope, $\frac{1}{2}$ dozen Grindstones, 10 dozen Handles.
By *W. B. Fox & Bro.*—400 pounds Wood Handles, 750 pounds Hardware.
By *New Home Sewing Machine Company*.—4 boxes Sewing Machines.
By *Coombs, Crosby & Eddy*.—10 cases Weights, 1 case Cord, 50 sets Bows, 2432 Spokes, 9 cases Axle Grease, 600 pounds Nails, 6 dozen Wood Faucets, 1 case House Furnishing Goods, 15 dozen Handles.

PER BARK PEERLESS, SEPTEMBER 1, FOR PORT NATAL, AFRICA.

By *W. H. Crossman & Co.*—1050 pounds Sash Weights, 76 pounds Cord, 24 cases Plow Parts.
By *J. A. Gifford*.—1 barrel Hardware, 2 packages Carriage Woodwork.
By *R. W. Cameron & Co.*—54 cases Plows.
By *Corner Bros. & Co.*—60 cases Agricultural Implements, 22 barrels Hardware, 96 cases Hardware, 51 cases Agricultural Implements.
By *H. W. Peabody & Co.*—11 cases Agricultural Implements, 2 cases Hardware, 30 dozen Shovels, 10 cases Agricultural Implements, 16 cases Edge Tools.
By *Coombs, Crosby & Eddy*.—7 Pumps, 2 dozen Tools, 2 dozen Picks, 30 dozen Hammers, 100 pounds Nails, 3 dozen Carriage Ware.
By *Marcial & Co.*—2 dozen Axes, 2 dozen Picks, 11 dozen Hammers, 30 dozen Shovels.

PER BRIG ELECTRIC LIGHT, SEPTEMBER 6, FOR EAST LONDON.

By *Arkell & Douglas*.—12 cases Plow Parts, 1 case Castings, $1\frac{1}{2}$ dozen Whip Stocks, 48 Plows, 5 cases Hardware, 2 cases Tacks, 9 dozen Bits, 1 dozen Churns, $\frac{1}{2}$ dozen Lawn Sprinklers, 24 dozen Saws, 9 dozen Knives, $\frac{1}{2}$ dozen Scales, $8\frac{1}{2}$ dozen Axes, 1 case Whetstones, 8 dozen Axes, 2 cases Saws, 1 case Fret Saws, 22 Blocks, 1 dozen Drawer Knives, 16 dozen Granite Ware, 1 case Hardware, 24 dozen Saws, 2 dozen Apple Parers, 1 case Hinges, $3\frac{1}{2}$ dozen Gas Fixtures, 10 dozen Bits, 2 crates Washers, 1 dozen Hatchets, 6 dozen Handles, 6 pairs Springs, 50 dozen Handles, 112 Plows, 1 barrel Rope, 21 dozen Axes, 500 Handles, 109 kegs of Nails, 20 dozen Handles, 18 boxes Sash Weights, 15 Hinges, 76 packages Plow Fittings, 24 dozen Hatchets, 3 Ranges, 3 packages Utensils, 1 dozen Scales, 18 Washing Machines, 132 cases Agricultural Implements.
By *Corner Bros. & Co.*—2 cases Agricultural Implements.
By *W. H. Crossman & Bro.*—10 dozen Axes, 10 dozen Hatchets, 1250 pounds Sash Weights, 183 pounds Cord, 90 cases Plow Parts, 10 Scrapers, 27 packages Carriage Ware, 10 pounds Cotton Twine.
By *R. W. Forbes & Son*.—9 packages Hardware, 1 dozen Wringers, 6 dozen Axes, $\frac{1}{2}$ dozen Snaths, 12 dozen spades, 29 cases Nails, 16 dozen Traps, 8 sets Axes.

PER BARK CAMELOT, SEPTEMBER 8, FOR FREEMANTLE, AUSTRALIA.

By *F. B. Wheeler & Co.*—2 cases Castings.
By *H. W. Peabody & Co.*—11 cases Hardware, 160 pounds Stone, 27 cases Fire Arms, 3 dozen Egg Beaters, 5 packages Traps, 6 dozen Whips, 400 papers Nails, 12 dozen Bells, 7 cases Edge Tools, 1 case Dust Pans, 1 bundle Carriage Ware, 3 dozen Stroops, 4 cases Sewing Machines, &c., 8 packages Agricultural Implements, 7 packages Windmills, 1-6 dozen Pumps, 3 cases Bolts, 43 packages Carriage Ware, 9 dozen Shovels, 550 dozen Handles, 2 packages Agricultural Implements, 5 packages Hardware, 500 pounds Castings, 36 dozen Shade Rollers, 8 1-4 dozen Pumps, 7 cases Axes, $\frac{1}{2}$ dozen Primers, 1 case Agricultural Implements, 1 bundle Hardware, 7 dozen Edge Tools, 1000 Handles, 1 case Handcuffs, 1 case Drilling Machinery, 1 case Wire Goods,

5 cases Agricultural Implements, 5 cases Hardware, 1150 pounds Bolts, 6 cases Fire Arms, 2 packages Pumps, 13 packages Hardware, 2 packages Agricultural Implements, $\frac{3}{4}$ dozen Wringers, $\frac{1}{4}$ dozen Pumps, 4 packages Hardware, 1 case Agricultural Implements.

By *R. W. Forbes & Son*.—11 packages Hardware, 15 dozen Axes, 5 dozen Hay Forks, 127 dozen Tool Handles, 12 dozen Shovels, 1 dozen Scales, 4 packages Pumps, 6 dozen Axes, 34 dozen Handles, 4 packages Churns, 1 dozen Trucks, 8 dozen Axes, 10 packages Pumps.

By *W. H. Crossman & Bro.*—4 $\frac{1}{2}$ dozen Saws, 26 packages Carriage Ware, $1\frac{1}{2}$ dozen Churns, 6 dozen Scythes, 6 dozen Snaths, $\frac{1}{2}$ dozen Washers, 57 dozen Cow Bells, 32 dozen Axes, 22 dozen Hatchets, 3 dozen Mattocks, 118 dozen Handles, 266 pounds Nails, 30 dozen Hay Forks, 4 Stoves, 5 dozen Stencils, 12 dozen Fly Traps, 2 gross Axle Grease, 2 dozen Guns, 7 cases Cartridges, 7 cases Hardware, 3 cases Hardware, 5 cases Carpenters' Tools.

Items.

The Cincinnati Lead Pipe and Sheet Lead Works, John D. Abraham, proprietor, 21 and 23 East Ninth street, Cincinnati, Ohio, have issued one of the most complete catalogues devoted to this line of goods which is placed at the service of the trade. It represents a varied line of Lead Pipe, Sheet Lead, Pumps, Plumbers', Steam and Gas Fitters' Supplies, Iron Pipes and Fittings, Brass Goods, Sanitary Specialties, &c. It is a volume of more than 500 pages, which is utilized in a compact and judicious display of the different goods. The cuts are for the most part of medium size, and avoid the extremes into which manufacturers and merchants sometimes fall. They are sufficiently large to represent the goods clearly, while permitting the display of a varied line in a volume of convenient size. The catalogue has a full and satisfactory index, and is substantially bound.

C. E. Hudson, Leominster, Mass., advises us that he has recently had some complaint from his Western trade that the Little Star Parer, Corer and Slicer was not what he represented it to be, and that it could be bought from certain dealers at less than he was charging for it. Upon investigation it was found that certain parties were selling the Hudson '88 for the Little Star Parer, a substitution which was possible where the parties were not acquainted with both machines. They look very much alike, but the '88 machine is inferior to the Little Star, being a cheaper machine and intended for a class of trade who are unwilling to pay the price of the Little Star. Mr. Hudson desires to remind parties intending to purchase the Little Star that the name Little Star is cast on the frame of the machine, so that the trade can easily determine whether or not they are receiving this machine.

Dauchy & Co., manufacturers of Sidewalk and Vault Lights, Chicago, having found their business outgrowing the facilities offered in their present location at 127 Indiana street, are erecting a new building on Illinois street, between Wells and Franklin streets. The building will be especially adapted to their purposes and will include a foundry for the purpose of making their own castings. Hitherto they have had this work done by outside foundrymen. The new works occupy a lot 64 feet front by 100 feet deep. The building is of brick and is of peculiar design. The front portion is five stories high, including a large and well-lighted basement. The foundry occupies a one-story extension in the rear. The front building will be used for office purposes and will also be stocked with the necessary machinery for fitting and finishing work. The new works will be ready for occupancy in about a month. The name of the firm is also to be changed to Dauchy Iron Works, for which a charter of incorporation has been secured. The

officers of the new company are as follows: George K. Dauchy, president; C. H. Ross, vice-president; L. O. Dauchy, secretary; Samuel O. Dauchy, treasurer. With the advantages and increased facilities which will be enjoyed in the new establishment, the proprietors look forward to a considerably increased business.

The Goodell Company, Antrim, N. H., for whom the Alford & Berkele Company, 77 Chambers street, New York, are agents, have issued a revised catalogue of their Table Cutlery, Butcher and Shoe Knives, &c. In this list some changes are to be noted and some new patterns are represented, among which may be mentioned Nos. 1375 C, 1385 C, 2375 C and 2385 C, Table and Medium Knives and Forks. It will interest the friends of the company throughout the country to know that David H. Goodell, the president and principal stockholder of the company, is the Republican nominee for Governor of New Hampshire.

Chambers, Brother & Co., Philadelphia, have transferred their business to Chambers Bros. & Co., a corporation organized under the laws of the State of Pennsylvania. The stockholders of the new company comprise the members of the old firm of Chambers, Brother & Co., and there has been no change in the management of the business except that it will be hereafter carried on by a corporation in lieu of a partnership.

Wall Mfg. Company, Cobalt, Conn., who are well known as manufacturers of Sleigh, Hand, House and Gong Bells, have appointed J. C. McCarty & Co., 97 Chambers street, New York, their sole agents for the sale of their goods in the United States, and also for the export trade.

The Barton Bell Company, formerly of Easthampton, Conn., have removed their entire business to Marion, Ind., and have issued their illustrated price list No. 96, which shows the line of goods of which they are well-known manufacturers with the new styles and patterns lately added. In their introductory address to the trade they refer to the fact that the larger part of their product has been sold west of New York and Pennsylvania, while their raw materials, Copper, Spelter and Leather, coming from the West, they concluded that it would be in the interest of economy to establish a manufactory near the consumers and thus effect a saving of transporting the raw material from the West to New England and the finished product back again to the Western consumers. While in this way freight is saved, the saving of time is also mentioned, the company's location being now such that they can communicate by mail with the principal cities of the West in from 6 to 36 hours. The company have erected commodious buildings of stone, brick, iron and wood and have also added materially to their plant of machinery. There is a gas well in connection with the factory,

The trade will learn with regret of the sudden death, on the 3d inst., of William A. Cassell, of the well-known Hardware firm of Fillmore, Cassell & Co., Zanesville, Ohio.

Sidney Shepherd & Co., Buffalo, N. Y., and C. Sidney Shepard & Co., Chicago, Ill., call attention in their advertising space, on page 64, to the Buffalo Mincing knife, the special feature of which is that it has a double adjustment, as indicated in the illustrations.

The catalogue issued by N. R. Streeter & Co., Rochester and Groton, N. Y., is a neat pamphlet in which the different styles of Laundry Hardware are represented. In the introductory circular to the trade information is given in regard to the efforts made to secure the high qual-

ity of the goods, while the subsequent pages give detailed descriptions of the different articles, including Smoothing, Polishing and Fluting Irons, which are their leading line. Can Openers, Twine Holders, Vegetable Mashers, Ice Tools, Meat Masticators and other goods are also represented.

D. Round & Son, Cleveland, Ohio, manufacturers of Chain, Differential Pulley Blocks, &c., have appointed J. C. McCarty & Co., 97 Chambers street, New York, their agents, and we are advised that they will be at all times prepared to name the most favorable terms.

John P. Lovell's Sons, Boston, Mass., in their advertisement on page 61 show, it will be observed, a variety of styles of Campaign Helmets which they are putting on the market, and these goods, although somewhat outside of the regular Hardware line, will doubtless at this time be regarded by the trade with especial interest. This feature of the company's business, though a temporary one, has already reached, we are advised, large proportions. Hibbard, Spencer, Bartlett & Co., Chicago, Ill., and the E. C. Meacham Arms Company, St. Louis, Mo., are the Western distributors of the goods.

The Chapman Manufacturing Company, Meriden, Conn., some of whose goods are represented in their advertisement on page 58, have issued a new and very satisfactory catalogue and price list of Chime Sleigh Bells, Plumes, &c., which they are putting on the market. A number of novel and attractive styles are represented in connection with the staple goods and patterns which have heretofore been on the market. The catalogue is a handsomely printed pamphlet of nearly 60 pages and is fully illustrated.

Moore & Barnes Mfg. Company, 103 Chambers street, New York, issue a circular relating to the Surprise Clothes Wringer, manufactured by the Auburn Wringer Company, Auburn, N. Y., for whom they are agents. Full and explicit information is given in regard to this Wringer, and the points which are made in its favor are enumerated.

The trade will observe among the Special Notices on page 47 one in which the stock and business of a well-known Missouri River jobbing house are offered for sale. Those who are interested in such an opportunity will find information given in regard to the trade of the city and the house, and other points tending to show the desirability of the opening. It is intimated that the house are not desirous of disposing of the stock before January 1, and by that time it can be reduced to between \$50,000 and \$60,000 worth. Further particulars may be obtained from William B. Fox & Brother, 97 Chambers street, New York.

F. G. Ford, Shawmont avenue, Rockborough, Pa., issues circulars relating to some of his patented specialties, rights for which he is offering for sale. They include his combined Milk Strainer and Sprinkler, Common Sense Funnel, Centennial Milk Strainer, Hook and Socket for carriage and sleigh seats and other articles.

The St. Joseph Pump Company, St. Joseph, Mo., issue circulars describing the Perfection Water Elevator and Purifying Pump, the construction and advantages of which are explained. They allude especially to their new Cup or Bucket, which is described as made of one piece of open-hearth steel, cut out by a die and folded in shape, with double flanges and double seam. They refer also to the extent of their plant and their facilities for the prompt execution of orders for carload lots.

Our readers will observe an important announcement on page 47 in regard to the sale of the business of William A. Ives & Co., near New Haven, Conn. The opportunity is deserving the attention of those who desire such an investment.

L. Bolles Hoe and Tool Company, Binghamton, N. Y., have issued their price list for 1888-1889, in which their well-known lines of Hoes is represented. The list as given is revised to date.

It will be seen that Dame, Stoddard & Kendall, Boston, Mass., in their advertisement on page 55 show the New Acme Pattern Ladies' Skate, which is placed on the market this season for the first time. They also illustrate the American Acme Pattern Club Skate, and call attention to their complete line of Winslow's Ice Skates.

The American Tool Company have removed from 116 Chambers street to 200 West Houston street. In their old quarters they were rather cramped for room, and were compelled to seek larger accommodations. They are now in a five-story building where they have increased capacity for filling large orders for Tool Chests promptly. Attention is called to their advertisement on page 56.

J. E. Davis & Co. have succeeded Nettleton & Davis as manufacturers' agents for the sale of Hardware, at 115 Dearborn street, Chicago. J. K. Nettleton retires on account of ill health.

Steel Goods.

The market for Hoes and Forks is regarded as in an exceptionally satisfactory condition, and the fact that Wood Goods are also in good shape improves the situation. Orders are reported to be coming in freely, and it is thought not unlikely if the present condition of things continues that a slight advance may be made before very long. While no intimation is given by the manufacturers of an advance in quotations, it is considered by some well-advised parties that merchants who place their orders early will be on the safe side. We give below the standard list of the Fork and Hoe Makers' Union, in which it will be observed that a few changes have been made since the close of the past season. It will be of interest to the trade as giving them the accurate list and other points in regard to the goods. The regular discount, it will be remembered, is 65 and 5 per cent., the terms of sale being that all goods shipped between November 1 and March 1, for spring trade, shall be 60 days from March 1, or 2 per cent. discount for cash within 10 days from March 1, and on all other goods 60 days from date of shipment, or 2 per cent. discount for cash within 10 days:

Socket and Solid Shank Hoes.

	Per dozen.
Polished Cast Steel Socket Hoes, Selected Handles.....	\$9.00
Polished Cast Steel Socket Hoes (second quality).....	8.25
Polished Cast Steel Solid Shank, Selected Handles.....	8.00
Polished Cast Steel Solid Shank (second quality).....	7.25
Polished Cast Steel Solid Shank Ladies' Hoes.....	6.00
Polished Cast Steel Solid Shank Onion or Nursery Hoes.....	7.00
Polished Cast Steel Socket Onion or Nursery Hoes.....	8.00
Polished Cast Steel Solid Shank Mortar or Street, 6 ft. handle, 10 in. blade.....	13.00
Polished Cast Steel Solid Shank, Mortar or Street, 9 in. blade.....	12.00
New Pattern Special Mortar Hoe.....	15.00
Polished Cast Steel Solid Shank California Hoes, 9 in. blade.....	12.00
Polished Cast Steel Solid Shank Toy Hoes.....	4.25
Polished Cast Steel Solid Shank Boys' Hoes, 48 in. handles, blades 5½ to 6 in., by 4 in. deep.....	7.00
Polished Cast Steel Solid Shank Riveted Hoes.....	5.25
Polished Cast Steel Socket Riveted Hoes.....	5.50
Washington County Solid Shank Hoes.....	9.00
Washington County Socket Hoes.....	10.00
Socket Mortar or Street and California Hoes, \$1.50 per doz. additional.	
Handles in Field Hoes limited to 4½ ft. in length.	

Handles in Mortar Hoes 6½ and 7 ft. advance 75 cts. per foot per doz. list, and over 7 ft. advance \$1 per foot per doz. list for the excess over 6 ft.

Extra for riveting or nailing punched Shanks in Hoes 50 cents per dozen list.

The cold rolled Socket and Shank Field Hoes, made by the Ely Hoe and Fork Company, list 25 cents per dozen less than regular.

Solid Shank Handled Planters' Hoes.

	Per dozen.
Polished Cast Steel Planters' Hoes, 6 and 6½ inch blades, 4½-foot handles.....	\$9.50
Polished Cast Steel Planters' Hoes, 6½-inch blades, 5-foot handles.....	10.00
Polished Cast Steel Planters' Hoes, 7-inch blades, 5-foot handles.....	10.50
Polished Cast Steel Planters' Hoes, 7½-inch blades, 5½-foot handles.....	11.00
Polished Cast Steel Planters' Hoes, 8-inch blades, 5½-foot handles.....	11.50
Polished Cast Steel Planters' Hoes, 8½-inch blades, 5½-foot handles.....	12.00
Polished Cast Steel Planters' Hoes, 9-inch blades, 5½ or 6 foot handles.....	12.50
Polished Cast Steel Planters' Hoes, 10-inch blades, 5½ or 6 foot handles.....	13.50
Socket Planters' Hoes, \$1.50 per dozen above list on Shank Hoes of same width of blade.	

Solid Shank Cotton Hoes.

Cast Steel Cotton Hoes, 6 and 6½ inch blade, 4½-foot handles.....	\$8.25
Cast Steel Cotton Hoes, 6-inch blade, 5-foot handles.....	8.50
Cast Steel Cotton Hoes, 6½-inch blade, 5-foot handles.....	8.50
Cast Steel Cotton Hoes, 7-inch blade, 5-foot handles.....	8.75
Cast Steel Cotton Hoes, 7½-inch blade, 5-foot handles.....	9.00
Cast Steel Cotton Hoes, 8-inch blade, 5½-foot handles.....	9.50
Cast Steel Cotton Hoes, 8½-inch blade, 5½-foot handles.....	10.00
Cast Steel Cotton Hoes, 9-inch blade, 5½-foot handles.....	10.50
Cast Steel Cotton Hoes, 10-inch blade, 6½-foot handles.....	11.50
Socket Cotton Hoes, \$1.50 per doz. additional.	

Weeding Hoes and Rakes.

Polished Cast Steel, 6-teeth Weed Hoes and Rakes.....	\$9.50
Polished Cast Steel, 4-teeth Weed Hoes and Rakes.....	8.50
Six-teeth, Malleable Iron, Full Polished, Cast Steel Blade.....	5.50
Four-teeth, Malleable Iron, Full Polished, Cast Steel Blade.....	5.00
Polished Cast Steel, Sharp or Square Point Weed Hoes.....	5.75
Polished Cast Steel, Two-Prong Weed Hoes.....	7.00
Polished Cast Steel, Five-Prong Weed Hoes.....	8.00

Garden Rakes.

Polished Cast Steel, 6-teeth Garden Rakes.....	\$6.00
" " 8-teeth ".....	8.00
" " 10-teeth ".....	9.00
" " 12-teeth ".....	10.00
" " 14-teeth ".....	11.00
" " 16-teeth ".....	12.00

"Braced" Steel Garden Rakes advance \$1.50 per dozen list.
Socket Steel Garden Rakes advance \$1.50 per dozen list.

Manure Forks.

Round 4-Tine, L. H. Cast Steel Forks, Common Ferrule.....	\$12.50
Round 4-Tine, L. H. Cast Steel Forks, Strap Ferrule.....	14.00
Round 4-Tine, D. H. Cast Steel Forks, Common Ferrule.....	13.50
Round 4-Tine, D. H. Cast Steel Forks, Strap Ferrule.....	15.00
Oval 4-Tine, L. H. Cast Steel Forks, Common Ferrule.....	12.50
Oval 4-Tine, L. H. Cast Steel Forks, Strap Ferrule.....	14.00
Oval 4-Tine, D. H. Cast Steel Forks, Common Ferrule.....	13.50
Oval 4-Tine, D. H. Cast Steel Forks, Strap Ferrule.....	15.00
Oval 5-Tine, D. H. Cast Steel Forks, Common Ferrule.....	20.50
Oval 5-Tine, D. H. Cast Steel Forks, Strap Ferrule.....	22.00
Oval 6-Tine, D. H. Cast Steel Forks, Common Ferrule.....	23.50
Oval 6-Tine, D. H. Cast Steel Forks, Strap Ferrule.....	25.00
Round 5 and 6 Tine Forks, same price as oval.	
Long Handles on 5 and 6 Tine Forks, \$1 per dozen less than D Handles.	
Handles over 4½ feet on Manure Forks, advance 75 cent per foot per dozen list.	

Spading Forks.

Cast Steel, 4 Flat-Tine D. H. Spading Forks, Common Ferrule.....	\$17.00
Cast Steel, 4 Angular-Tine, D. H. Spading Forks, Common Ferrule.....	18.00
Cast Steel, 4 Angular-Tine, D. H. Spading Forks, Com. Ferrule, 5 lbs. less weight.....	17.00
Cast Steel, 4 Angular-Tine D. H. Spading Forks, Com. Ferrule, 5 lbs. less weight, blued and half polished.....	16.00
Cast Steel, 4 Angular-Tine D. H. Spading Forks, Common Ferrule.....	24.00
Extra Heavy Square Shoulder Spading Forks advance \$2 per dozen list.	
Long Handles on Spading Forks, \$1 per dozen less than D. H.	
Strap Ferrules on Spading Forks, more per dozen, \$1.50.	

Hay and Straw Forks.

Round 2-Tine, Cast Steel Forks, Common Ferrule.....	\$7.25
Round 2-Tine, Cast Steel Forks, Strap Ferrule.....	8.75

Oval 2-Tine, Cast Steel Forks, Common Ferrule.....	7.25
Oval 2-Tine, Cast Steel Forks, Strap Ferrule.....	8.75
Round 3-Tine, Cast Steel Forks, Common Ferrule.....	9.00
Round 3-Tine, Cast Steel Forks, Strap Ferrule.....	10.50
Oval 3-Tine, Cast Steel Forks, Common Ferrule.....	9.00
Oval 3-Tine, Cast Steel Forks, Strap Ferrule.....	10.50
2-Tine C. S. Boys' or Tedding Forks, 4 1/2-foot handle, 8 1/2-inch tine.....	6.00
3-Tine C. S. Boys' or Tedding Forks, 4 1/2-foot handle, 10 1/2-inch tine.....	7.75
With bent handles, extra per dozen, 50 cents.	
Twelve inches (as near as practicable) measured in a straight line from inside of the head to the point, is the standard length of Tine on all regular Hay.	
Straw and Four Tine Manure Forks, except with the D. Handle 4 Tine Manure Forks, which may be made 13 inches.	
14-inch Manure Forks shall be advanced \$1.50 per doz. over the standard list.	

Forks with Extra Length of Tine.

3 Tine Hay, Straw and Barley Forks.	Per dozen.
3 Tine, 13 inch, more than 12 inch, 50 cents, making.....	\$9.50
3 Tine, 14 inch, more than 13 inch, 75 cents, making.....	10.25
3 Tine, 15 inch, more than 14 inch, \$1, making.....	11.25
3 Tine, 16 inch, more than 15 inch, \$1.25, making.....	12.50
With Bent Handles, extra per doz. 50 cts.	
With Strap Ferrules, extra per doz. \$1.50.	
4 Tine Hay, Straw and Barley Forks, Bent Handles.....	
4 Tine Hay, Straw and Barley Forks, Bent Handles.....	\$12.50
4 Tine, 13 inch, more than 12 inch, 75 cents, making.....	13.25
Round or Square Shoulders, 14 inch, more than 13 inch, \$1, making.....	14.25
Round or Square Shoulders, 15 inch, more than 14 inch, \$1.25, making.....	15.50
Round or Square Shoulders, 16 inch, more than 15 inch, \$1.50, making.....	17.00
Extra for riveting or nailing punched Shanks in Forks.....	.50
4 Tine Barley Forks, 18 inch Tine, with Guard, Bent Handles.....	22.50
With Straight Handles, less per dozen, 50 cts.	
With Strap Ferrules, more per dozen, \$1.50.	
Handles in Hay, Straw and Barley Forks 6 1/2 and 7 ft. advance 75 cts. per foot per doz. list, and over 7 ft. advance \$1 per foot per doz. list for the excess over 6 ft.	

Potato and Manure Hooks.

Round 4 Tine, Cast Steel Potato Hooks.....	\$7.50
Round 4 Tine, Cast Steel Potato Hooks, Oval or half Oval.....	7.50
4 Tine, Cast Steel Potato Hooks, Washington County Pattern.....	12.00
Flat 4 Tine, Cast Steel Potato Hooks, Red and Blue Extra Finish.....	8.50
4 Tine, Cast Steel Potato Hooks, Diamond or Oval Back.....	9.50
5 Tine, Cast Steel Potato Hooks, Round or Oval.....	10.00
5 Tine, Cast Steel Potato Hooks, Round or Oval, Goose Neck.....	10.00
6 Tine, Cast Steel Potato Hooks, Round or Oval.....	11.00
6 Tine, Cast Steel Potato Hooks, Round or Oval, Goose Neck.....	11.00
4 Tine, Potato Hook, Flat or Oval Back, Bent Tines, heavy.....	10.50
5 Tine, Malleable Iron, Round or Oval.....	5.50
4 Tine, Cast Steel Manure Hooks, Round or Oval, 6 ft. Handle.....	10.00

Second Quality Hay and Manure Forks.

2 Tine, \$0.75 per dozen less than regular goods.	
4 " " 1.00 " " " "	
4 " " 1.50 " " " "	
4 " " 2.00 " " " "	
6 " " 2.50 " " " "	

Second quality Forks shall be those apparently inferior to first quality goods, and shall in all cases be put on second grade handles.

Third Quality Manure Forks.

4 Tine 4 1/2 ft. Handles, half polish, 1 1/2 inch Tine, Common Ferrule.....	\$9.00
4 Tine, 4 1/2 ft. Handles, half polish, 1 1/2 inch Tine, Strap Ferrule.....	10.50
4 Tine D Handles, half polish, 1 1/2 inch Common Ferrule.....	10.00
4 Tine D Handles, half polish, 1 1/2 inch Tine, Strap Ferrule.....	11.50
Turf Edgers. Clam Hooks.	
Shank Turf Edgers.....	\$9.00
Socket Turf Edgers.....	10.00
6 Prong Clam Hooks.....	12.00

Trade.

From our Louisville correspondent we have the following advices in regard to the Hardware business of that city:

The Hardware trade of Louisville, Ky., continues good in all lines, the volume gradually increasing as the fall comes on. The abundant crop yields, although realizing low prices, insure certain returns on the country merchants' calculation. This class of customers has been very cautious in buying, but frequently lately the jobbers have had good levers to work on, such as advances in Nails, Bar and Sheet Irons, Bolts, &c., all of which bear good results. With the exception of Nails, the dealers have been fully forewarned of advances, and were able to lay in good stocks,

on which they are reaping nice profits. Bar Iron is holding firm from mills at last advance, and Sheet Iron is scarce at buyers' prices. This fact makes it easy to sell from store, and the demand is increasing. Barbed and Plain Wire, instead of sympathizing with other commodities, have taken another cut and are now selling at lower prices than ever known before. A sudden upward movement is looked for, yet the dealers are afraid to contract ahead for fear of still lower figures. Recent advances are being well upheld; occasionally some factory, jealous of competitor's heavy shipments, makes sly cuts to large customers, but this is rare, and firm prices rule. The retailers are having a good trade with contractors and country customers, and the House-Furnishing business, such as Stoves, Grates, &c., is beginning to be lively. The Furniture factories have about all they can attend to. There is no complaint from dealers, and the one answer from all is that business is good.

The Competition in Ciphers.

Besides lists of cipher words in accordance with the terms of the competition we are receiving also a number of answers to the problem given in our last issue, some of our correspondents at the same time expressing their views in regard to the general subject, and others explaining the manner in which the solution was reached. One of our correspondents writing from Philadelphia explains his method as follows:

The last letters of prices per half dozen, *t, m, k, l, o*, must be even, and the others, *r, w, a, s, e*, odd. The first four prices, *r, w, a, s*, must be greater than 1, since their products by 6 have two figures. Therefore *e* = 1 and from price of Manicure Cases *o* = *e* x 6 = 6. Either *k* or *m* may equal 0, these being the only even figures which do not begin prices. But from price of Bird Seed, since *e* = 1, *k* must equal 2 or 8. Therefore, *m* = 0. From price of Tooth Brushes, since *m* = 0, *a* = 3, and *w* = 5. From price of Bird Seed, since *a* = 3, *k* = 8. From price of Soap, since *w* = 5, *l* = 4 and *s* = 9. From price of Nail Brushes, since *l* = 4, *t* = 2 and *r* = 7. The word used is, therefore, *metalworks*.

The correspondent whose letter is given below refers to the problem in the following terms:

Your correspondent in current issue of *The Iron Age* is evidently more of a mathematician than business man. His cipher is too easy. It was seen after a few minutes' examination that he sold half a dozen for just six times the price of one, which is not usual. Had he marked his goods as follows:

	Each.	Per half dozen.
Nail Brushes.....	r	a k
Tooth Brushes.....	w	t w
Bird Seed, packages.....	a	e o
Soap, cakes.....	s	w m
Cologne, bottles.....	o l	a t m
Manicure cases.....	t a e	e t t w

he would have more nearly approached a price and caused more difficulty in solving the cipher, which, as it was, was no task at all. In fact, the only catch was another business error in having the figure 0 represented by the first letter instead of the last of his cipher, as it resulted in obtaining "etal works m," instead of metal works. It is usual and more natural to count 1, 2, &c., leaving the last letter for the cipher, a person remembering the word much easier that way. Give us a harder one.

SYRACUSE.

A correspondent in Bloomington, Ill., writes as follows in regard to the competition:

It seems to me that you might make your specifications a little plainer and for this purpose I beg to ask the following questions: Do you mean to restrict the list to words found in the main part of the dictionary and supplement, which give only English words and their definitions,

and to exclude all proper names, Bible names, &c., which are not found in these two sections of the dictionary? Further, do you allow the use of plurals of words which are found in the two sections named above?

The spirit of the conditions which we gave in announcing this contest would exclude Bible names, proper names, &c., and all words not found in the main part of the dictionary and the supplement. We do not think that plurals are necessarily excluded. Inasmuch as our correspondent asks for supplementary instructions we can only express an opinion and cannot make this binding, for since the publication of the conditions the whole matter has been in the hands of the committee who are to determine the result. We give this simply as our own interpretation of the conditions as first presented. We trust this will be of assistance to our correspondent.

Another solution of the cipher problem is as follows, and comes from Cleveland, Ohio:

By writing down the numbers from 1 to 9 and multiplying each by 6 as follows:

1 x 6 = 6
2 x 6 = 12
3 x 6 = 18
4 x 6 = 24
5 x 6 = 30
6 x 6 = 36
7 x 6 = 42
8 x 6 = 48
9 x 6 = 54

We see that all the even numbers, 2, 4, 6, 8, are repeated in the product when multiplied by 6, while the odd ones are not. This shows that the first four prices given are all odd numbers, as the respective letters are not repeated in the half dozen prices. We see, further, that in the half dozen prices of the first four articles the letter "l" appears twice, so by setting off the odd numbers, with their products:

1 x 6 = 6
3 x 6 = 18
5 x 6 = 30
7 x 6 = 42
9 x 6 = 54

we find that the number 4 occurs twice; therefore "l" must be 4 and, by comparison, "l" is 42; "w l" 54, and, by division, "r" is 7 and "s" is 9. The balance are easily found; for "a l" being 54, "a" is 5 and 5 x *a* = *a m*, or 30, and, if "a m" is 30, *a* is 3 and "e k" 18. This gives all the answers, except for 0, which can be found by dividing "a k l" or 384 by 6, giving 64, making 0 equal to 6. The price mark complete is:

METAL WORKS

0 1 2 3 4 5 6 7 8 9

Trade Topics.

Relating to the arrangement of Hardware stores we have the following letter from a Pennsylvania merchant, in which he makes an appeal for more information from the smaller retailers in regard to their store methods and arrangements. While many of the contrivances which we have described have been received from the class designated, and while others can be adapted with more or less modification by this class of trade, we take pleasure in emphasizing the point made by our correspondent, and requesting contributions on this subject in accordance with his suggestion:

No doubt the readers of *The Iron Age* take great pleasure in reading the details about business and Hardware stores, as given from time to time, but it strikes me that the large dealers are generally the ones represented. I have an idea that the bulk of the retail trade throughout the country is done by the small fry. Have you no subscribers among the latter class—namely, those who do business of from \$5000 to \$25,000—that we do not hear from

them, and see cuts and arrangements of their stores, which run in size all the way from 12 x 20 feet to 22 x 60 feet? Think it about time to see something in print from them.

We have also the following letter in regard to the purchase of goods:

The suggestion in a recent issue as to the retailers buying direct from the manufacturer is, I think, right to the point, but it would be difficult to do it. The extras given by the jobbers for quantities are generally so large that the retailer is tempted to load up, and the result is, as stated, a large and unsaleable stock, bills due and notes the same way. Besides, the large retailer is to all appearances placed on the same plane with the exclusive jobber in the matter of buying from the manufacturer, and hence the continuous cutting in the retail trade and eventual loss and bankruptcy. Brethren of the strictly retail trade, let us hear from you.

Arrangement of Stores.

We have received from C. T. Rosenthal, Batesville, Ark., advices in regard to a method of sampling Cutlery, for which he has obtained a patent. The accompanying illustrations, Figs. 268 and 269, illustrate

from the rear, as shown in Fig. 269, such numbers, marks and other signs relating to the quality, cost, price, &c., of the Knives can be placed. They are thus in full view of the salesman standing behind the counter but concealed from the customer in front of it. By this ingenious contrivance it will be seen that the goods are effectively displayed. The stock is kept clean and within easy reach. It is also intimated that the customer seeing but one Knife of each pattern will usually purchase the sample, thus permitting it to be replaced by a fresh one, the accumulation of shopworn goods being thus avoided.

New Mexico is probably destined soon to be developed into a prosperous State. Various extensive railway schemes are in embryo, and, now that opportunities have been discovered for irrigating enormous sketches of land, the inducements to agriculturists are attracting many settlers.

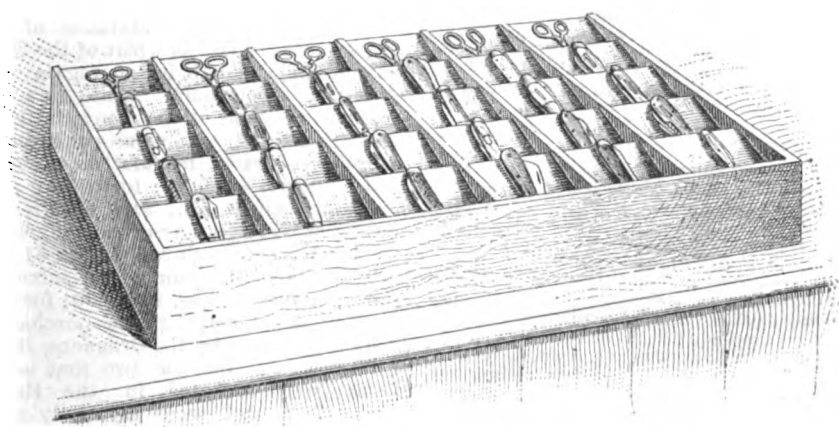


Fig. 268.—C. T. Rosenthal's Cutlery Show Case.—Front View

his method, giving different views of his Cutlery sample case, Fig. 268 showing it as seen by the customer from the front of the counter and Fig. 269 representing it as it appears to the salesman behind the counter, while at the same time it indicates the manner in which it is constructed. It should, however, be explained that the Cutlery case is intended to be used generally in a glass showcase, which is not represented in the engraving.

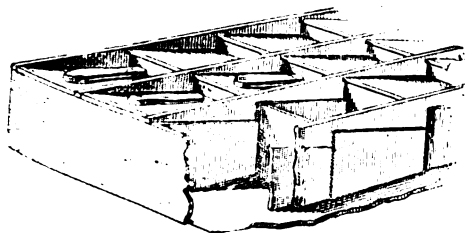


Fig. 269.—Details of Cutlery Case.

ings. From these illustrations it will be seen that the invention consists of a box or case with partitions, as shown. Each of the compartments thus formed is covered by an independent lid, on which after any desirable covering or finish has been given to it the sample of the Knife contained in such compartment is placed. These covers rest upon zinc-lined ways or supports, so that they run down toward the front of the case, so as to give a satisfactory view of the Knife. This construction provides, it will be seen, for displaying upon the cover a sample of the goods contained in each compartment, while on the exposed upper portions of the partitions, which are visible only

Respecting the characteristics of the country a Santa Fé correspondent says: While the climate of New Mexico may be described as everywhere mild and dry, the differences in altitude cause marked local differences in various parts, while the resources of the almost uniformly rich soil also vary materially in correspondence with the influence of the climate. The altitude gradually diminishes from north to south, from between 6000 and 8000 feet above the sea level in the northern portion for the habitable and arable regions, to between 4000 and 5000 feet in the southern parts, following the general descent of the Rio Grande and Rio Pecos. It is distinctively a mountainous country, with the unbroken chain of the Rockies descending into the northern part, below which the mountains rise from the mesas in detached groups. These mountains have the most important effect on the arability of land; were it not for these, the whole country would be almost the absolute desert it has long been reputed to be; but their summits condense the moisture and deposit it in snows on the higher peaks and in frequent rains on the slopes of all. The water breaks out in springs at their feet and descends into the plains in small streams.

By means of improved light-draft steamers with an adjustable keel adapted to shoal water it is believed that the interests of navigation on the Mississippi River can be revived, and a profitable traffic be restored. With this object the Lucas River and Ocean Ship Company have been formed at St. Louis, and a few days ago Mr. Cahill, an earnest advocate of this enterprise, addressed a public meeting, at which he stated that, while mechanics had made

wonderful strides in perfecting machinery for river navigation, there had been no change in the models used in constructing the hulls. While the Lucas ship does not contain anything new, the mode of applying the old ideas, he said, will mark an era in river navigation. The trouble at present is that we have no means of reaching Spanish-American points with cheap transportation. The gentleman claimed that the Lucas ship would cover the ground, as we would be able to load a cargo at the St. Louis wharves, and not only place it aboard the wharves of the different seaport towns bordering on the Gulf of Mexico, but would be able to enter the different rivers thereby to deliver goods to interior towns. In return the ship could be loaded with all the valuable products of these tropical countries and brought direct to the interior without reshipment. It is proposed to build one of the ships to demonstrate the practicability of the scheme.

Colorado is expecting to take rank, in a very few years, among the great manufacturing States. She claims to have all the materials that can be found in the East, with every promise of a rapid growth of population. The various industries requiring iron and coal can there find the best material in inexhaustible quantity and of the best quality. The shipment of coal eastward this year, as far as the Missouri River, will equal 500,000 tons. The wool clip in 1887 was about 8,000,000 pounds, and that of 1888 will exceed 12,000,000 pounds. The means of transportation in Colorado comprise 20 lines of railroad, and reach every portion of the State. The Denver and Rio Grande, the greatest narrow gauge system on the globe, operates over 1500 miles, its connections reaching all points abroad. The Colorado Midland, a new standard gauge road, affords transit from the center of the State to the Northwest. The systems of the Union Pacific, Kansas Pacific, Burlington and Missouri, Atchison, Topeka and Santa Fé and the Missouri Pacific all traverse the State. Within the past few weeks has been witnessed the completion of the Pan Handle route from Denver to the Gulf of Mexico, opening up to Colorado the markets of the great South.

The removal of the \$50,000 subsidy to the Australian line of steamships by Postmaster-General Dickinson causes much rejoicing in San Francisco, where it is predicted that in a very few years the line will be self-supporting. The *Commercial Herald* says: "Our commerce with the Australias is increasing at a rapid pace. It now not only employs the steamship line, but a flourishing line of clipper ships, and it will not stop where it is now by any means. For seven months of the year the imports from Australia and New Zealand have reached \$801,680; the exports, \$983,900—close on \$1,000,000. The latter in particular is very nearly equal to the whole exports of 1887, so that our trade is improving in the most desirable direction. The complete figures for the present year will far exceed those for 1887, or, we believe, for the matter of that, any other year in the history of the trade. For all this we are certainly indebted to the subsidy so liberally paid by the colonies until now. We hope that for the future we shall be able to subsidize our own vessels, if need be, with or without the aid of the colonies, whose trade we so ardently desire."

The *West Shore*, a monthly magazine published at Portland, Ore., prints a supplement illustrating and describing the charcoal furnace and the pipe foundry of the Oregon Iron and Steel Company at Oswego, Ore.

Foreign Markets.

EQUIVALENTS		Cents.
Franc, Peseta or Lira.....		19.3
Florida (Netherlands).....		40.2
Florida (Austria).....		35.9
Wirels (Portugal).....		11.08
Wirels (Brazil).....		54.8
Mark (Germany).....		23.8
	Pounds.	220.5
Kilogram.....		134.
Picul.....		134.

EAST INDIES.

SINGAPORE, July 11, 1888.—Tin.—Some small sales were made here at down to \$29.75 $\frac{1}{2}$ picul, but the advance in London has revived the hopes of holders, and no sellers could be found except at fancy prices. Buyers offer \$31 and under. Supplies are being kept back and shipments will again be very small. *Tonnage*.—Steamers get 27/6 @ 30/ for weight. Via canal there is no tonnage offering; via Cape the Macca Company quotes 22/6 @ 25/ for weight. For Boston the berth is vacant. *Exchange*.—is quoted 3/1 $\frac{1}{2}$ for 6 months' sight credits. The *Laertes*, a steamer clearing for New York on June 28, took 504 piculs.—*Gillfillan, Wood & Co.*

SINGAPORE, September 4, 1888.—Tin.—August shipments from the Straits Settlements to the United States amounted to 300 tons, against 750 in 1887; to England, 1800, against 1300; since January 1 they were respectively 1450, against 35,550 and 12,400, against 8800.—*Gillfillan, Wood & Co., to Charles Nordhaus, New York, per cable direct.*

PENANG, July 20, 1888.—Receipts.—Tin during the fortnight reached about 10,000 piculs, of which Europeans took 3600, while Chinese bought altogether 9000. The market opened at \$33.50, receded to \$31.55, and after touching \$33.70 closed at \$33.60. Chinese have purchased at \$33.10 to ship to Singapore August 1. Shipments hence to England since January 1 amount to 79,568 piculs; to the United States, 1854. *Gum Benjamin* has brought \$34 @ \$39 for good merchantable, *Gutta-Percha* \$60 @ \$100, and *India Rubber* \$70 @ \$75. *Exchange*.—Four months' sight Bank on London, 3/1 $\frac{1}{2}$ @ 3/1 $\frac{1}{2}$.—*Schmidt, Kustermann & Co.*

MANILA, September 4, 1888.—Hemp.—Has been quiet at \$10 $\frac{1}{2}$ picul, against \$9.25 same date last year, equalling $\frac{1}{2}$ ton, cost and freight, \$33.47, against \$33.17. The clearances for the United States since last cable amounted to 7000 piculs, against 3000 last year, and since January 1 to 109,000, against 150,000. There are loading at present for the same destination 49,000 bales, against 29,000, while there have been cleared for England since January 1 243,000 bales, against 147,000 in 1887; loading for ditto, none, against 5000; cleared for all other ports, 51,000, against 28,000. Receipts at all ports since last cable, 14,000, against 17,000; since January 1, 399,000, against 334,000 in 1887 and 272,000 in 1886. *Freight*, \$6, against \$6. *Exchange*, 3/5 @ 3/9.—*Ker & Co. to Charles Nordhaus, New York, per cable direct.*

COLOMBO, July 19, 1888.—*Plumbago*.—Is firm at the following quotations, in rupees $\frac{1}{2}$ ton: Large lumps, 145 @ 170; Ordinary ditto, 135 @ 160; Chips, 80 @ 95, and Dust, 40 @ 65. Following have been the shipments since October 1: To England 61,676 cwt.; to Marseilles, 38; to Trieste, 523; to Hamburg, 7415; to Antwerp, 3359; to Bremen, 1012; to India, 82; and to the United States 130,332—altogether, 204,437 cwt., against last year, 183,339, 145,341 in 1886, and 159,246 in 1885. *Coir Yarn*, Nos. 1 to 4, may be quoted 7 @ 12 rupees $\frac{1}{2}$ cwt. *Exchange*, six months' sight, 1/4 $\frac{3}{4}$ @ 1/4 7-16.—*Volkart Bros. through their Agent, John W. Greene, 82 Wall street, New York.*

SPAIN.

BILBAO, August 25, 1888.—*Iron Ore*.—The first week following upon our report of the 11th inst. was still a dull one, whereas last week has been lively at 7/6 @ 8/ for Campanil and 6/10 @ 7/3 for Rubios. Still the demand for shipment abroad has fallen off considerably this year thus far, in part because it appears to be less needed, and partially because the owners of some of our mines have screwed their pretensions too high all along. Total shipments since January 1 sum up 2,494,122 tons, against 2,980,677 last year. *Pig Iron*.—During the first week of the fortnight under review little transpired, shipments abroad being restricted to 320 tons, and coastwise to 1136, but last week more was done for export, especially to Italy per steamer *Cranwood*, some 3111 tons being shipped, and 575 leaving our harbor coastwise.—*Bilbao Maritimo y Comercial.*

GERMANY.

HAMBURG, September 1, 1888.—*Iron*.—Pig Iron has been dull during the week in Rhenish-Westphalia. Stocks have increased some-

what in consequence of importations from England. Production in Germany and Luxembourg in July has been 354,111 tons as compared with 326,075 tons last year, and since January 1 it has been to the close of July, 2,460,825 tons, against 2,174,556 last year. The July production was made up of 177,320 tons Forge and Spiegel; 34,095 Bessemer; 100,216 Thomas and 42,480 Foundry. There has been a resumption of English purchases of Spiegel; the orders extend all the way to the close of the year. The quotation at Siegen remains 54 marks $\frac{1}{2}$ ton for 10 to 12 % Manganese. Both Forge Pig and Bessemer have been neglected, the former at 46 @ 47 at Siegen, but Thomas has been more active. Foundry Pig Iron has been in good request and firm, the demand from foundries being large. English Bessemer has been obtainable on the West Coast at 44, an advance of 6d; Merchant is selling to a satisfactory extent at home, and the export demand also slowly revives. Structural Iron has continued lively; the demand for Beams exceeds the productive capacity. Hoop iron is less wanted. Competition among makers is on the increase. and the price now 136 to 137.50 Boiler Plates sell with as much ease as heretofore, thin Sheets less so; Siegen quotes the latter 146 to 150. Prices in the Wire branch remains firmly sustained. Machine shops are doing well, especially for the Navy. The increase of water-works in Germany causes an enormous demand for Cast-Iron Pipe. Advances from Upper Silesia continue encouraging; even in the Wire branch it is believed that a giving way in prices will be avoided. The 27 Coke blast furnaces in blast were all doing well. *Metals* are unaltered and quite firm in this market.—*Borsenhalle.*

RUSSIA.

ST. PETERSBURG, August 30, 1888.—*Petroleum*.—The annual statement of accounts and balance sheet for the year 1887 of the Nobel Brothers Naphtha Production Company has just been submitted to the shareholders. The dividend declared for last year is 6 %. The assets are composed as follows: Real estate, 12,054,510 rubles; steamships, 5,307,086 rubles; rolling stock, 2,824,000; material for manufacturing purposes, 1,355,686 in this city and 515,276 in the various entrepôts. Naphtha on hand, 2,793,282; cash, 94,126; deposits in bank, 261,636; outstandings, 2,495,441. The amounts of money held in reserve are 7,752,616 rubles. The company owe 3,468,859 rubles bonds outstanding and 22,000 shares of, together, 15,000,000 rubles.—*Journal de St. Petersburg.*

The New Navy.—The Navy Appropriation bill has received the signature of the President and has become a law. It adds four cruisers and three gunboats to the new fleet, making an aggregate of 30 vessels of various classes. We have now the four Roach cruisers, Chicago, Atlanta, Boston and Dolphin, classed as 15-knot and 16-knot vessels. We have also under completion the five monitors, which will be slow, but will carry ten-inch guns, and can be used for harbor defense. We have in course of construction three gunboats of 16 knots, the Yorktown, Bennington and Concord, and one of 13, the Petrel, besides the three of 2000 tons authorized in the current act, from which 18 knots are expected. Of the cruisers, the Charleston, already launched, and the Newark are to make 18 knots, while the Baltimore, the Philadelphia and the San Francisco and the two 3000-ton vessels of the present act are to make 19 knots. The 5600-ton cruiser in this act is to be guaranteed to make 20 knots, which is the speed of the Vesuvius, the dynamite vessel. The Herreshoff torpedo boat will go at least 22 knots. More important than any of these are the three armored cruisers, of which the Maine and Texas are building, while a third, larger than either, is now authorized. The plans for an armored coast-defense vessel are being perfected. Here are 30 vessels to form the basis of an efficient navy, and the purchase of the swift little Stilleto has made the number 31.

A destructive fire in San Francisco, on Sunday, 9th inst., caused general havoc among the iron works and involved factories, mills and other manufacturing property to the extent of \$1,000,000.

The loss of the National Iron Works is estimated at \$130,000; of the Novelty Iron Works, \$22,000 and the Columbia Foundry, \$25,000. Few particulars have been received.

Ordinance for the Army.

The conference reports on the Fortifications and Army Appropriation bills were adopted in both houses on Monday. The report on the Army bill drops all the Senate amendments for the manufacture of ordnance. The Fortifications bill, as agreed to, embodies Mr. Sayers's proposition appropriating \$1,500,000 for steel forgings, which was originally a subject of strong opposition. The Army bill, as finally agreed upon, carries an appropriation of \$24,471,300. The Fortification bill appropriates \$3,972,000. These bills had provisions for the same purpose which were inserted by the Senate, with a view to securing the appropriation in one of them if the House should disallow it in the other. The chief item so duplicated was that known as the Hawley amendment, which appropriated more than \$6,000,000 for ordnance. The substance of this amendment remains as a part of the Fortification bill, though its aggregate is reduced about one-half. Aside from the regular provisions of the Army and Fortifications bills, these measures appropriate as follows: For the manufacture of cannon and carriages, \$200,000; for testing pneumatic guns, shells, &c., \$100,000; for gun factory at Watervliet Arsenal, \$700,000, for the purchase of rough-bored steel, \$1,500,000; for submarine mines and submarine controllable torpedoes, \$200,000; for rifled mortars, \$250,000; for the purchase of tests of ordnance by the Ordnance Board, \$500,000. All but the two first named items were included in the Hawley amendment, and were especially championed in the House by Mr. Sayers, of Texas.

The Harvey Steel Company, of Jersey City, announce that they are now erecting large works at Newark, N. J., fully equipped with rolls, hammers, &c., for the manufacture of steel. The works are to be ready for general orders on all high grades of steel, January 1, 1889. During the interval they are utilizing their present works and process for the treatment of all kinds of drop dies and forgings used in pressure work, &c., and made from Bessemer steel.

W. G. Price & Co., of Pittsburgh, proprietors of the Berlin Iron and Lead Works, some time ago decided to remove their works from that city on account of excessive taxes and the high rates charged for natural gas. The firm looked at several sites at McKeesport, which is about 15 miles from Pittsburgh, but finally decided to locate at Greensburg, which is situated on the Pennsylvania Railroad, 31 miles from Pittsburgh. The citizens of that place offered the firm a free site for their works and other inducements, which have been accepted. The work of removal will begin at an early date.

Charles Frederick Herreshoff, of Bristol, R. I., died of pulmonary disease, at his home in that city, on Saturday evening, in the 80th year of his age. Mr. Herreshoff was the father of the famous Herreshoffs, the boat builders. Many of the fastest boats built by the Herreshoffs were modeled by the father.

The Chicago, Burlington and Quincy Railroad, one of the dozen largest lines in the country, has lost \$5,318,715 in net earnings for the first seven months of the current year. Strikes and a rate war have done this in equal shares.

The Lewis Lawn Mower.

The Seneca Falls Lawn Mower Company, Seneca Falls, N. Y., of which J. N. Hammond and W. P. Elwell are proprietors, are putting on the market a new lawn

voir with stem; C is the collar on side plate that holds oil reservoir; D is the axle with conical ends on which the wheels run; E is the screw that holds oil reservoir in place; F is the screw to be taken out to fill reservoir with oil. The

tractions, light and strong, and the point is made that they do not cut the lawn, and that they take a firm hold of the ground, doing away with any slipping or lost power and imparting a continuous motion to the knives, while the wheels working independently of each other, the fly keeps in motion and performs its work when the machine is run around curves. The further points made in regard to this machine are: That it cuts smoothly, runs easily, is light, strong and compact, is thoroughly built of the best materials and all the parts are made interchangeable.

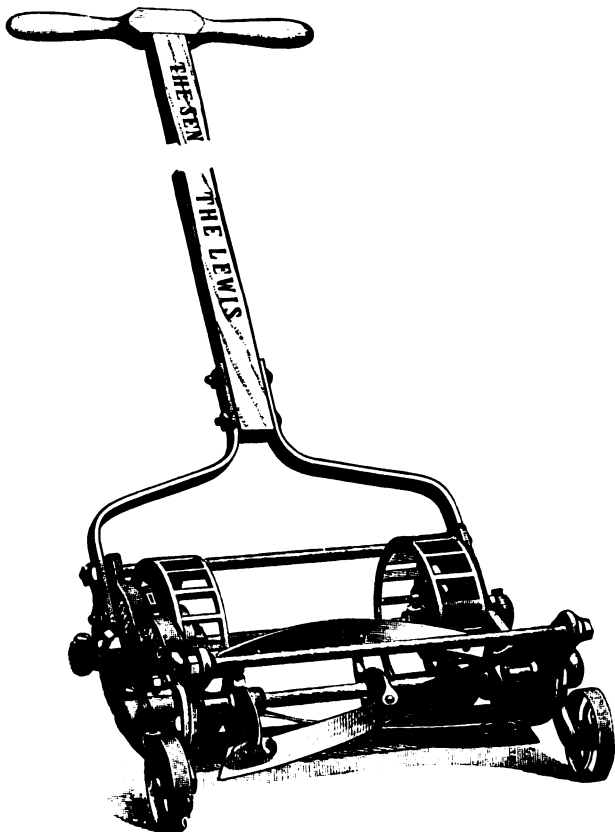


Fig. 1.—The Lewis Lawn Mower.

mower which is named the Lewis, a general view of which is given in Fig. 1, a special feature of its construction being shown in Fig. 2. This is a front-cut machine, with its driving wheels worked independently of each other, in order that it may do its work up to and around obstructions. The driving wheels are in the rear of the fly, in order to avoid running over and crushing uncut grass. The axles have conical bearings and the oil

company allude to the manifest advantage of this self-lubricating arrangement as obviating the necessity of carrying oil cans on the lawn, and also the fact that it is

The first sheet of plate glass manufactured in this country is still doing duty in

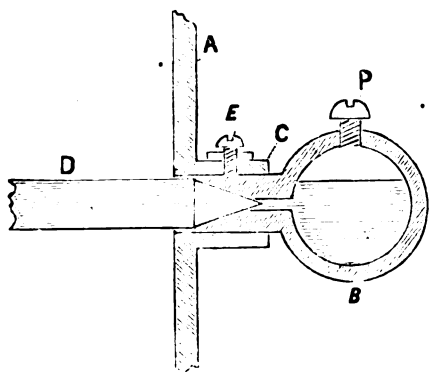


Fig. 2.—Self-Lubricating Device.

reservoirs are provided with stems with flaring mouths, in which fit the conical bearings of the axles. An important feature in the construction of the machine, and one which the manufacturers emphasize as embodying special advantages, is the fact that it is self-lubricating, the axles both of the driving wheels and of the cutting cylinder or fly running on centers in adjustable boxes that have a self-feeding oil chamber. The details of this part of the machine are shown in Fig. 2, which gives a longitudinal section through the axle and oil reservoir. This construction will be readily understood; A is the side plate of the machine; B is the oil reser-

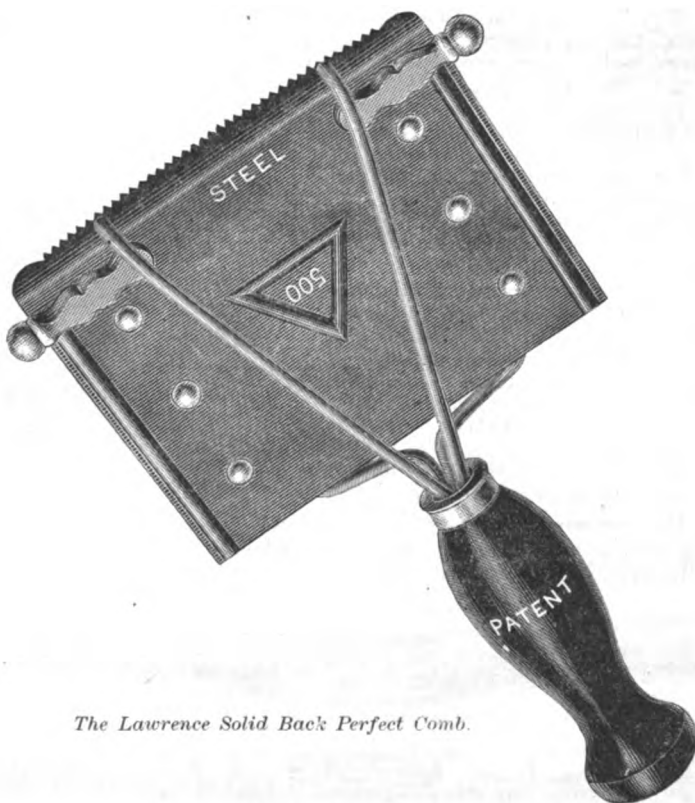
not necessary in the use of the machine to stop work for the purpose of oiling it. They also emphasize the point that these self-oiling boxes are adjustable, so that the wear can be taken up. It is also to be observed that the driving wheels are open

the show-window of a store in New Albany, Ind. The glass was made by Capt. J. B. Ford, at the plate glass works of that city, when he was operating them. He was called the pioneer of plate glass manufacturing in America.

The Lawrence Solid Back Perfect Comb.

The Lawrence Curry Comb Company, 204 and 206 East Forty-third street, New York, have recently put on the market a new curry comb, which is represented in the accompanying illustration. It is designated as a solid back perfect curry comb. Special attention is called to the fact that it is made of steel, and is the only steel Perfect comb on the market. It is made six or eight bars of heavy steel, with steel wires, tinned rivets and knocker and enameled handles. It is made also in iron. These combs are referred to as very strong and durable and of attractive and convenient pattern, while the prices at which they are offered deserve the attention of the trade.

Chamberlain, Wheeler & Co., Columbus, Ohio, announce that Mr. Cartwright has removed to St. Louis to represent their interest in the office recently opened in that city. Mr. Wm. C. Hayward will succeed Mr. Cartwright at their office at No. 58 Dearborn street, Chicago. Their brands are Gore, Norway, Crown, Akron, Bessie, Winona, Sheffield, Jefferson (Cold blast) and Pencost Ferro-Silicon.



The Lawrence Solid Back Perfect Comb.

Humphrey's Cavity Plane.

The Humphrey Tool Company, of Warren, Mass., are directing the attention of

the Atchison, Topeka and Santa Fe, and Mr. Strong appears satisfied that a speed of 70 miles per hour can be attained between Chicago and Kansas City

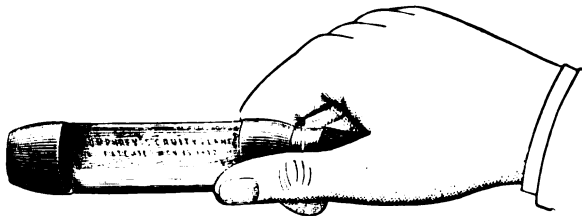


Fig. 1.—Tool Arranged for Use with One Hand.

woodworkers to a very neat and convenient plane, which they are offering in three sizes of each style shown in the accompanying engravings. Fig. 3 presents a general view of the plane, showing the handles with and without tips. The center piece of the tool, holding the knife or cutting blade, is of metal, while the handles are of wood. The knife, which is of fine tool steel, is firmly held in position by screwing up one or both of the handles, or it may be done by removing the tips from the ends of the handles and inserting them in place of the handles, thus securing a very short tool. There are no set-screws or other projections, and the whole tool is constructed with a view to using in close places. As will be seen by reference to Fig. 3 of the engravings, the handles are slightly offset to enable the operator to employ the tool in surface-

when the engine in question is employed to haul the trains. As regards the Strong locomotive No. 444 on the Lehigh Valley

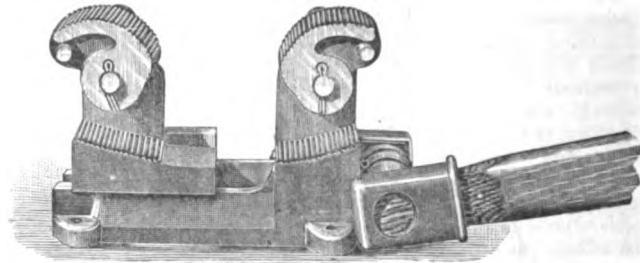


Fig. 1.—Champion Tire Shrinker.

Road, to which we have had occasion to refer several times in these columns, it may not be without interest to note that

and works equally well on light steel tire and on wagon tire 4 x 1 inch. When the machine is not being used the handle can be taken out of the socket. The floor space occupied by the tire shrinker is 18 x 10 inches and its weight is 130 pounds.

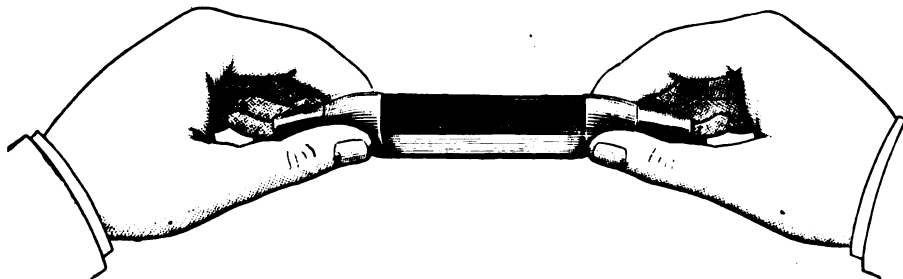


Fig. 2.—Short Tool for Use where the Handles would be in the Way.

work. In Fig. 1 is shown the plane with the handle at the left removed, making it a right-hand tool. In order to adjust it for use in this shape it is only necessary to remove one handle and screw up the other. For a left-hand tool the reverse operation is necessary. In order to make such a tool as is indicated in Fig. 2 of the cuts, take off one of the handles, and, using it as a screw-driver, remove the tip from the opposite handle and insert it in the place occupied by the handle removed. Then take off by the same process the other tip and insert it at the opposite end. Set the blade well back and tap it down to the required cut, after the handles are well screwed up. The manufacturers claim for this tool that it permits of working on short curves and plain surfaces; that the various adjustments are easily and quickly made; that it cuts clear and in every way satisfactorily.

A locomotive with the Strong valve gear and boiler is now nearly completed,

owing to the defective manner in which the seam between the combustion cham-

ber and furnaces was made, the enginesmoother, steadier and make less noise than ordinary belts. They are adapted to high-speed dynamos, especially those of alternating current system. Chas. A.



Fig. 3.—Humphrey's Cavity Plane.—Two Styles—with and without Tips to the Handles.

and will shortly make some experimental runs upon the New York and New England. The engine was built for

seam was subsequently adopted, and the engine is now at work on the Lehigh Valley hauling heavy passenger trains.

The Champion Tire Shrinker.

The cuts herewith given represent this article, which is manufactured by the Champion Blower and Forge Company, Lancaster, Pa. Fig. 1 represents the shrinker ready for use, while Fig. 2 indicates the method of its operation, showing it in use. The company explain that all that is necessary to operate the shrinker is simply to place the tire under the clamps, when by the least stroke of the hammer they drop over their center and lock firmly on the tire, when with but little pressure on the handle the tire can be shrunk as desired. The simplicity, durability and efficiency of this shrinker are mentioned, and it is claimed that it is managed by one man with perfect ease

Perforated Leather Belting.

We illustrate, in the annexed engraving, a novel method of preventing "air cushions" in belts run at a high rate of speed. The perforations are made in a regular and uniform manner and at equal distances apart over the entire surface of the belt, thus insuring, it is claimed, equal tension and leaving the tensile strength of the belt uninjured. Besides preventing "air cushions," these belts are said to run

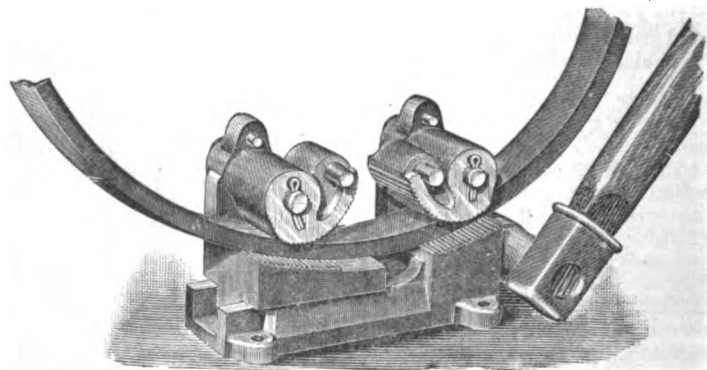


Fig. 2.—Champion Tire Shrinker in Use.



Perforated Leather Belting.

Schieren & Co., of New York, have just completed the machinery necessary for the manufacture of the belting.

SEPTEMBER 12, 1888.

Answer: d.

Corr. list June 10, '84.dis 75%52 1/2 %
Genuine Eagle, list Oct. '84.dis 75%10 %
Phila. pattern, list Oct. 7, '84.dis 75%10 @ 75%10 & 5 %
R. & W. old list.dis 70 %
Two-
Common, list Feb. 28, 1883.dis 70 %
P. C. B. & N. Co., Emu's list Feb. 28, 1883.dis 70 %
P. C. B. & N. Co., Philad. list Oct. '84.dis 82 1/2 %
P. C. B. & N. Co., Keystone, Phil. list Oct. '84.dis 80 %
P. C. B. & N. Co., Norway, Phil. list Oct. '84.dis 75%10 %
Am. S. Co., Norway, Phil. list Oct. 16, '84.dis 75%10 %
Am. S. Co., Rag'd, Phil. list Oct. 16, '84.dis 80 %
Am. S. Co., Philad. list Oct. 16, '84.dis 82 1/2 %
Am. S. Co., Bay State, list Feb. 28, '83.dis 70 %
R. & W. Philad. list Oct. 16, 1884.dis 82 %
R. & E. Mfg. Co.dis 70 %
Stove and Plov-
Stove.dis 62 1/2 %
Plov.dis 60 & 8 %
Am. S. Co. Stove, Annealed.dis 62 1/2 %
R. B. & W., Plov.dis 55 %
R. B. & W., Stove.dis 62 1/2 %
R. B. Mfg. Co., Stove.dis 62 1/2 %
Machine.dis 75%10 @ 80 %
Bolt Ends.dis 75%10 @ 80 %
Berax. 5 @ 40%10 & 4 %
Boring Machines.
Without Augers. Upright. Angular.
Douglass.5.50 34.75.dis 60 %
Snell's, Rice's Patent.5.50 6.75.dis 40%10 & 10 %
Jennings.5.50 6.75.dis 44%10 & 45%10 %
Other Machines.3.85 2.75.dis 40 %
Phillips' Pat., with Augers 7.00 7.50.not

Saw Pins
Humason, Beckley & Co.'s.dis 60%10 %
Sargent & Co.'s.\$17 and \$18.dis 60%10 %
Peck, Stow & W. Co.dis 50%10 @ 50%10 & 5 %

Braces.
Backus, Nos. 110 to 114 and 31 to 33.dis 60%50 & 60%10 %
Backus, Nos. 6, 8, 12, 14.dis 60%10 & 8 %
Backus, Nos. 16, 18, 30, 29, 7, 9, 11.dis 70%10 & 8 %
Barber's, Nos. 10 to 16.dis 60 %
Barber's, Nos. 30 to 33.dis 60%
Barber's, Nos. 40 to 68.dis 50%10 %
Barber's, Nos. 8, 10 and 12.dis 70%10 & 8 %
Barker's Plated, Nos. 8, 10 and 12.dis 55%10 %
Osgood's Ratchet.dis 40%10 & 60 %
Spofford's.dis 50%10 %
Ives' New Haven Novelty.dis 70 %
Ives' New Haven Ratchet.dis 6-25 @ 60%10 %
Ives' Barber Ratchet.dis 60%5 @ 60%10 %
Ives' Barbers.dis 60%5 @ 60%10 %
Ives' Sp.dis 60%10 %
Common Ball, American.\$1.10 @ \$1.15
Bartholomew's, Nos. 25, 27, 30.dis 50%10 & 60%5 %
Bartholomew's, Nos. 117, 118, 119.dis 70 %
Amidon's Barker's Imp'd Plan.dis 75%10 @ 80 %
Amidon's Barker's Imp. Nickeled.dis 65%10 @ 70 %
Amidon's Ratchet.dis 75%10 @ 80 %
Amidon's Eclipse Ratchet.dis 75%10 @ 80 %
Amidon's Glorified Jawed.dis 40%10 & 40 %
Amidon's Corner Brace.dis 40 @ 40%10 %
Amidon's Universal.\$ in, \$2.10, 10 in. \$2.25
Amidon's Buffalo Ball.\$1.10 @ \$1.15
P. S. & W.dis 50%10 %

Brackets.
Shelf, plain, Sargent's list.dis 55%10 @ 55%10 & 10 %
Shelf, fancy, Sargent's list.dis 60%10 @ 60%10 & 10 %
Reading, plain.dis 60%10 @ 60%10 & 5 %
Reading, Rosette.dis 60%10 @ 60%10 & 10 %

Bright Wire Goods.dis 85 @ 85%10 %

Broilers. 1 Inch. 5 @ 10 9 x 13
Horn's Self-Basting. 1 Per doz.\$4.50 5.50 6.50

Buckets.—See Wire Buckets and Pails.
Mail Kinks.—Union Co. Nut.dis 55 %
Sargent's.dis 60%10 @ 70%5 %
H. & W.dis 70 %
Humason, Beckley & Co.'s.dis 70 %
Peck, Stow & W. Co.'s.dis 50%10 @ 50%10 & 10 %
Ehrlich Hdw. Co., White Metal, low list.dis 50%10 %

Butcher's Cleavers.
Bradley's.dis 25 @ 30
L. & I. J. White.dis 20%5 %
Beatty's.dis 40 @ 40%5 %

Butts.
\$16.50 12.00 21.50 24.00 27.00 30.00 32.50 34.50
New Haven Edge Tool Co.'s.dis 40
P. S. & W.dis 33%45 @ 33%45 %

Butts.
Brass—
Wrought Brass.dis 70 @ 70%10 %
Cast Brass, Tiebout's.dis 33%4 %
Cast Brass, Corbin's Fast.dis 33%4 @ 10 %
Cast Brass, Loose Joint.dis 33%4 @ 10 %
Copper—
Fast Joint, Narrow.dis 60%10
Fast Joint, Broad.dis 55%10
Loose Joint.dis 80 %
Loose Joint, Japanned.dis 70 %
Loose Joint, Jap. with Acorns.dis 70 %
Parliament Butts.dis 70%10
Mayer's Hinges.dis 70%10
Loose Pin, Acorns.dis 70%10
Loose Pin, Acorns, Japanned.dis 70%10
Loose Pin, Acorns, Jap. Pltd. Tips.dis 70%10

Wrought Steel—
Fast Joint, Narrow.dis 70%10
Fast Joint, Lt. Narrow.dis 70%10
Fast Joint, Broad.dis 70%10
Loose Joint, Broad.dis 70%10
Loose Butts, Back Flaps, &c.dis 70%10
Inside Blind, Regular.dis 70%10
Inside Blind, Light.dis 70%10
Loose Pin.dis 70%10
Bronzed Wrought Butts.dis 40%10 @ 40%10 & 5 %

Calipers—See Compasses.

Calks, Tee
Gaulier. 5 @ 5%40 & 5 %
Dewicks. 5 @ 5%40 & 5 %

Can Openers.
Messenger's Comet. 7 doz \$3.00, dis 25 %
American. 7 gross \$3.00
Duplex. 7 doz \$5, dis 15 @ 20 %
Lymann's. 7 doz \$3.75, dis 20 %
No. 4, French. 7 doz \$2.25, dis 55 @ 60 %
No. 5, for handle. 7 gross \$3.00, dis 55 @ 60 %
Kure's. 7 doz \$2, dis 55 @ 60 %
Lime Solmers. 7 doz \$2.75 @ \$3.00
Star. 7 doz \$2.75 %
Sprague, No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241,

File for Machines.			
Knob, 1/4-inch hole.....	\$3.25 each		
Knob, 3/8-inch hole.....	\$3.00 each		
Eagle, 3/4-inch Roll.....	\$2.15	dis 35	
Eagle, 5/4-inch Roll.....	2.85	dis 35	
Crown, 6 1/2-in., \$3.50; 6-in., \$4.00; 5-in., \$4.50 each		dis 35	
Crown Jewel.....	6-in., \$2.50	dis 35	
Crown Hand Fluter, No. 83; 6-in., \$3.40; 5-in., \$4.50 each		dis 35	
Domestic Fluter.....	\$1.50	dis 35	
Geneva Hand Fluter, White Metal.....	5 dos \$12.	dis 35	
Crown Hand Fluter, No. 1; 5 1/2; 3, \$12.50; 2, \$10.00		dis 35	
Shepard Hand Fluter, No. 85.....	5 dos \$15.30	dis 40	
Shepard Hand Fluter, No. 110.....	5 dos \$11.	dis 40	
Shepard Hand Fluter, No. 95.....	5 dos \$3.	dis 40	
Combined Fluter and Sled Iron.....	5 dos \$15.	dis 35	
Combined Fluter and Sled Iron.....	5 dos \$15.00	dis 35	
Buffalo.....	5 dos \$10.00	dis 15	
Fluting Machine.....		dis 45	

Fly Traps.	
Paragon	per doz \$1.50 @ 1.75
Fodder Squeezers.	
Blair's, " Climax "	per doz \$2.00
Blair's, " Climax "	per doz \$1.25
Paragon, Cav. Mfg. Co. Assn. list	per doz \$1.50
Ray's, " Climax "	per doz \$1.50
Plated, see Spoona.	
Freezers, Ice Cream.	
Buffalo Champion	dis 60 @ 10.25 \$
Nephard's Lightning	dis 65 \$
White Mountain	dis 60 \$
Fruit and Jelly Presses.	
Gen. Erie Mfg. Co.	dis 30 @ 10 @ 30 \$
Kenia	per doz \$4.50
P. D. & Co	per doz \$4.50
Shepard's Queen City	dis 40 \$
Fry Pans.	
High List	dis 75 @ 5 @ 75 @ 10 @ 25 \$
No. 0 1 2 3 4 5 6 7 8 9 10 11 12	
Low List	\$3.75 4.70 5.30 5.95 6.55 7.50 8.75 10.00 11.95
No. 0 1 2 3 4 5 6 7 8 9	dis 70 @ 10 \$
per doz.	\$3.00 3.75 4.25 4.75 5.25 6.00 7.00 8.00 9.00
Fuse.	per 1000 ft.
Common Hemp Fuse, for dry ground	\$2.70
Common Cotton Fuse, for dry ground	2.55
Single Taped Fuse, for wet ground	6.00
Double Taped Fuse, for wet ground	6.00
Triple Taped Fuse, for very wet ground	7.25
Small Gutta Percha Fuse, for water	7.50
Large Gutta Percha Fuse, for water	12.00

Ganges.		
Marking Mortise, 20	...	dis 60@105
Wire, low Hat.	...	dis 10@10 1/2
Wire, Wheeler, Madden & Co.	...	dis 10 1/2
Wire, Brown & Sharnes	...	dis 50 @ 50 1/2
(3) wire, Nail and Spike	...	dis 10 @ 20 1/2
"Eureka" Gimlets	...	dis 50@10 1/2
"Diamond" Gimlets	...	dis 40@10 1/2
"Double Cut, Shepardson's."	...	7 gross \$5.00
"Double Cut, live"	...	dis 45 @ 45 1/2
"Double Cut, Douglass."	...	dis 60 @ 50 1/2
"Rec."	...	7 gross \$12. 1/2
"Ice," Le Page's Liquid	...	dis 25 @ 23 1/2
Wm. N. Le Page's Improved Liquid Glue	...	dis 35 1/2
Glue Pots	...	dis 25 @ 23 1/2
Tinned and Enameled	...	dis 40 1/2 @ 40 1/2
Family, Howe's "Eureka"	...	dis 40 1/2
Family, "C.C.'s" Handy	...	dis 50 1/2
Glinding	...	
Small at factory	...	7 ton \$7.50 @ 9.0
Wringstone Fixtures.	...	
Sargent's Patent.	...	dis 70@10 1/2
Reading Hardware Co.	...	dis 30@10 1/2

Hack Saws.—See Saws.

Halters.—Cover's, Rope, ¼-in. Jute.....dis 5022 3
Cover's, Rope, ¼-in. Hemp.....dis 4022 3
Cover's Adj. Rope Halters.....dis 4022 3
Cover's Hemp Horse and Cattle Tie.....dis 5022 3
Cover's Horse and Cattle Tie.....dis 604 1022 3

Hammers.

Handled Hammers.

Maddole's.....List Dec. 1, 1885, dis 28 @ 2541 04
Buffalo Hammer Co.....List Jan. 15, 77
C. Hammond & Son.....dis 50 @ 504
Humason & Beckley.....10 ¢
Atha Tool Co.....dis 40210 @ 50
Favers, R. Plumb.....dis 40210 @ 50
Verree.....dis 40
Magnetic Tack, Nos. 1, 2, 3, 4, 5, 1.25, 1.50 & 1.75.....dis 30410 25
Nelson Tool Works.....dis 40210 25
Warner & Nobles.....dis 30 @ 25 3
Peck, Stow & Wilcox.....dis 30 @ 25 3

Sarkens' *Hand Cuffs and Stocks*—*See page 102*
Hand Cuffs and Stocks—*See page 102*
 1 and under \$ 40¢ } dis 70 & 10
 3 to 5 lb \$ 36¢ } 75 %
 Over 5 lb \$ 30¢ }
 Wilkinson's Smiths' 10¢ @ 11¢ %
Hand Cuffs and Leg Irons.
 Providence Tool Co., Hand Cuffs, \$15.00 φ dos. dis 10 %
 Providence Tool Co., Leg Irons, \$5.00 φ dos. dis 10 %
 1 Hand, 2 Hands, 3 Hands, 4 Hands, 5 Hands, 6 Hands, 7 Hands, 8 Hands, 9 Hands, 10 Hands, 11 Hands, 12 Hands, 13 Hands, 14 Hands, 15 Hands, 16 Hands, 17 Hands, 18 Hands, 19 Hands, 20 Hands, 21 Hands, 22 Hands, 23 Hands, 24 Hands, 25 Hands, 26 Hands, 27 Hands, 28 Hands, 29 Hands, 30 Hands, 31 Hands, 32 Hands, 33 Hands, 34 Hands, 35 Hands, 36 Hands, 37 Hands, 38 Hands, 39 Hands, 40 Hands, 41 Hands, 42 Hands, 43 Hands, 44 Hands, 45 Hands, 46 Hands, 47 Hands, 48 Hands, 49 Hands, 50 Hands, 51 Hands, 52 Hands, 53 Hands, 54 Hands, 55 Hands, 56 Hands, 57 Hands, 58 Hands, 59 Hands, 60 Hands, 61 Hands, 62 Hands, 63 Hands, 64 Hands, 65 Hands, 66 Hands, 67 Hands, 68 Hands, 69 Hands, 70 Hands, 71 Hands, 72 Hands, 73 Hands, 74 Hands, 75 Hands, 76 Hands, 77 Hands, 78 Hands, 79 Hands, 80 Hands, 81 Hands, 82 Hands, 83 Hands, 84 Hands, 85 Hands, 86 Hands, 87 Hands, 88 Hands, 89 Hands, 90 Hands, 91 Hands, 92 Hands, 93 Hands, 94 Hands, 95 Hands, 96 Hands, 97 Hands, 98 Hands, 99 Hands, 100 Hands, 101 Hands, 102 Hands, 103 Hands, 104 Hands, 105 Hands, 106 Hands, 107 Hands, 108 Hands, 109 Hands, 110 Hands, 111 Hands, 112 Hands, 113 Hands, 114 Hands, 115 Hands, 116 Hands, 117 Hands, 118 Hands, 119 Hands, 120 Hands, 121 Hands, 122 Hands, 123 Hands, 124 Hands, 125 Hands, 126 Hands, 127 Hands, 128 Hands, 129 Hands, 130 Hands, 131 Hands, 132 Hands, 133 Hands, 134 Hands, 135 Hands, 136 Hands, 137 Hands, 138 Hands, 139 Hands, 140 Hands, 141 Hands, 142 Hands, 143 Hands, 144 Hands, 145 Hands, 146 Hands, 147 Hands, 148 Hands, 149 Hands, 150 Hands, 151 Hands, 152 Hands, 153 Hands, 154 Hands, 155 Hands, 156 Hands, 157 Hands, 158 Hands, 159 Hands, 160 Hands, 161 Hands, 162 Hands, 163 Hands, 164 Hands, 165 Hands, 166 Hands, 167 Hands, 168 Hands, 169 Hands, 170 Hands, 171 Hands, 172 Hands, 173 Hands, 174 Hands, 175 Hands, 176 Hands, 177 Hands, 178 Hands, 179 Hands, 180 Hands, 181 Hands, 182 Hands, 183 Hands, 184 Hands, 185 Hands, 186 Hands, 187 Hands, 188 Hands, 189 Hands, 190 Hands, 191 Hands, 192 Hands, 193 Hands, 194 Hands, 195 Hands, 196 Hands, 197 Hands, 198 Hands, 199 Hands, 200 Hands, 201 Hands, 202 Hands, 203 Hands, 204 Hands, 205 Hands, 206 Hands, 207 Hands, 208 Hands, 209 Hands, 210 Hands, 211 Hands, 212 Hands, 213 Hands, 214 Hands, 215 Hands, 216 Hands, 217 Hands, 218 Hands, 219 Hands, 220 Hands, 221 Hands, 222 Hands, 223 Hands, 224 Hands, 225 Hands, 226 Hands, 227 Hands, 228 Hands, 229 Hands, 230 Hands, 231 Hands, 232 Hands, 233 Hands, 234 Hands, 235 Hands, 236 Hands, 237 Hands, 238 Hands, 239 Hands, 240 Hands, 241 Hands, 242 Hands, 243 Hands, 244 Hands, 245 Hands, 246 Hands, 247 Hands, 248 Hands, 249 Hands, 250 Hands, 251 Hands, 252 Hands, 253 Hands, 254 Hands, 255 Hands, 256 Hands, 257 Hands, 258 Hands, 259 Hands, 260 Hands, 261 Hands, 262 Hands, 263 Hands, 264 Hands, 265 Hands, 266 Hands, 267 Hands, 268 Hands, 269 Hands, 270 Hands, 271 Hands, 272 Hands, 273 Hands, 274 Hands, 275 Hands, 276 Hands, 277 Hands, 278 Hands, 279 Hands, 280 Hands, 281 Hands, 282 Hands, 283 Hands, 284 Hands, 285 Hands, 286 Hands, 287 Hands, 288 Hands, 289 Hands, 290 Hands, 291 Hands, 292 Hands, 293 Hands, 294 Hands, 295 Hands, 296 Hands, 297 Hands, 298 Hands, 299 Hands, 300 Hands, 301 Hands, 302 Hands, 303 Hands, 304 Hands, 305 Hands, 306 Hands, 307 Hands, 308 Hands, 309 Hands, 310 Hands, 311 Hands, 312 Hands, 313 Hands, 314 Hands, 315 Hands, 316 Hands, 317 Hands, 318 Hands, 319 Hands, 320 Hands, 321 Hands, 322 Hands, 323 Hands, 324 Hands, 325 Hands, 326 Hands, 327 Hands, 328 Hands, 329 Hands, 330 Hands, 331 Hands, 332 Hands, 333 Hands, 334 Hands, 335 Hands, 336 Hands, 337 Hands, 338 Hands, 339 Hands, 340 Hands, 341 Hands, 342 Hands, 343 Hands, 344 Hands, 345 Hands, 346 Hands, 347 Hands, 348 Hands, 349 Hands, 350 Hands, 351 Hands, 352 Hands, 353 Hands, 354 Hands, 355 Hands, 356 Hands, 357 Hands, 358 Hands, 359 Hands, 360 Hands, 361 Hands, 362 Hands, 363 Hands, 364 Hands, 365 Hands, 366 Hands, 367 Hands, 368 Hands, 369 Hands, 370 Hands, 371 Hands, 372 Hands, 373 Hands, 374 Hands, 375 Hands, 376 Hands, 377 Hands, 378 Hands, 379 Hands, 380 Hands, 381 Hands, 382 Hands, 383 Hands, 384 Hands, 385 Hands, 386 Hands, 387 Hands, 388 Hands, 389 Hands, 390 Hands, 391 Hands, 392 Hands, 393 Hands, 394 Hands, 395 Hands, 396 Hands, 397 Hands, 398 Hands, 399 Hands, 400 Hands, 401 Hands, 402 Hands, 403 Hands, 404 Hands, 405 Hands, 406 Hands, 407 Hands, 408 Hands, 409 Hands, 410 Hands, 411 Hands, 412 Hands, 413 Hands, 414 Hands, 415 Hands, 416 Hands, 417 Hands, 418 Hands, 419 Hands, 420 Hands, 421 Hands, 422 Hands, 423 Hands, 424 Hands, 425 Hands, 426 Hands, 427 Hands, 428 Hands, 429 Hands, 430 Hands, 431 Hands, 432 Hands, 433 Hands, 434 Hands, 435 Hands, 436 Hands, 437 Hands, 438 Hands, 439 Hands, 440 Hands, 441 Hands, 442 Hands, 443 Hands, 444 Hands, 445 Hands, 446 Hands, 447 Hands, 448 Hands, 449 Hands, 450 Hands, 451 Hands, 452 Hands, 453 Hands, 454 Hands, 455 Hands, 456 Hands, 457 Hands, 458 Hands, 459 Hands, 460 Hands, 461 Hands, 462 Hands, 463 Hands, 464 Hands, 465 Hands, 466 Hands, 467 Hands, 468 Hands, 469 Hands, 470 Hands, 471 Hands, 472 Hands, 473 Hands, 474 Hands, 475 Hands, 476 Hands, 477 Hands, 478 Hands, 479 Hands, 480 Hands, 481 Hands, 482 Hands, 483 Hands, 484 Hands, 485 Hands, 486 Hands, 487 Hands, 488 Hands, 489 Hands, 490 Hands, 491 Hands, 492 Hands, 493 Hands, 494 Hands, 495 Hands, 496 Hands, 497 Hands, 498 Hands, 499 Hands, 500 Hands, 501 Hands, 502 Hands, 503 Hands, 504 Hands, 505 Hands, 506 Hands, 507 Hands, 508 Hands, 509 Hands, 510 Hands, 511 Hands, 512 Hands, 513 Hands, 514 Hands, 515 Hands, 516 Hands, 517 Hands, 518 Hands, 519 Hands, 520 Hands, 521 Hands, 522 Hands, 523 Hands, 524 Hands, 525 Hands, 526 Hands, 527 Hands, 528 Hands, 529 Hands, 530 Hands, 531 Hands, 532 Hands, 533 Hands, 534 Hands, 535 Hands, 536 Hands, 537 Hands, 538 Hands, 539 Hands, 540 Hands, 541 Hands, 542 Hands, 543 Hands, 544 Hands, 545 Hands, 546 Hands, 547 Hands, 548 Hands, 549 Hands, 550 Hands, 551 Hands, 552 Hands, 553 Hands, 554 Hands, 555 Hands, 556 Hands, 557 Hands, 558 Hands, 559 Hands, 560 Hands, 561 Hands, 562 Hands, 563 Hands, 564 Hands, 565 Hands, 566 Hands, 567 Hands, 568 Hands, 569 Hands, 570 Hands, 571 Hands, 572 Hands, 573 Hands, 574 Hands, 575 Hands, 576 Hands, 577 Hands, 578 Hands, 579 Hands, 580 Hands, 581 Hands, 582 Hands, 583 Hands, 584 Hands, 585 Hands, 586 Hands, 587 Hands, 588 Hands, 589 Hands, 590 Hands, 591 Hands, 592 Hands, 593 Hands, 594 Hands, 595 Hands, 596 Hands, 597 Hands, 598 Hands, 599 Hands, 600 Hands, 601 Hands, 602 Hands, 603 Hands, 604 Hands, 605 Hands, 606 Hands, 607 Hands, 608 Hands, 609 Hands, 610 Hands, 611 Hands, 612 Hands, 613 Hands, 614 Hands, 615 Hands, 616 Hands, 617 Hands, 618 Hands, 619 Hands, 620 Hands, 621 Hands, 622 Hands, 623 Hands, 624 Hands, 625 Hands, 626 Hands, 627 Hands, 628 Hands, 629 Hands, 630 Hands, 631 Hands, 632 Hands, 633 Hands, 634 Hands, 635 Hands, 636 Hands, 637 Hands, 638 Hands, 639 Hands, 640 Hands, 641 Hands, 642 Hands, 643 Hands, 644 Hands, 645 Hands, 646 Hands, 647 Hands, 648 Hands, 649 Hands, 650 Hands, 651 Hands, 652 Hands, 653 Hands, 654 Hands, 655 Hands, 656 Hands, 657 Hands, 658 Hands, 659 Hands, 660 Hands, 661 Hands, 662 Hands, 663 Hands,

Best and Heavy	.....	dis 40	10 25
Saw and Plane	.....	dis 40	10 25
Hammer, Hatchet, Axe, Sledge, &c	.....	dis 35	10
Bradawl	.....	gross 12	00
Hickory Firmer Chisel, assorted	.....	gross 4	50
Hickory Firmer Chisel, large	.....	gross 8	00
Apple Firmer Chisel, assorted	.....	gross 4	00
Apple Firmer Chisel, large	.....	gross 8	00
Socket Firmer Chisel, assorted	.....	gross 3	00
Socket Firmer Chisel, large	.....	gross 6	00
Socket Framing Chisel, assorted	.....	gross 6	00
J. B. Smith Co's Pat. File	.....	dis 50	5
File, assorted	.....	gross 2	75
Auger, assorted	.....	gross 50	10
Auger, large	.....	gross 7	00
Patent Auger, live	.....	dis 40	10
Patent Auger, Douglass	.....	set 1	25 net
Patent Auger, Swan's	.....	set 1	50 net
Hoe, Rake, Shovel, &c	.....	dis 12	00
Cross Cut Saw Handles—			
Atkins' No. 1 Loop, pair, 80¢	No. 2, 23¢	No. 2,	
and No. 4 Reversible, 22¢			
Boynton's Loop Saw Handles	.....	50¢, dis 60	00

Hangers.		
Barn Door, old patterns.....	dis 60x10x10	75¢
Barn Door, New England.....	dis 60x10x10	75¢
Samson's Anti-Friction.....	dis 5F	75¢
Hamilton Steel.....	dis 5F	75¢
Hamilton Wrought Wood Track.....	dis 5F	75¢
U. S. Wood Track.....	dis 5F	75¢
champion.....	dis 60x19	75¢
Rider and Wooster, Medina Mfg. Co.'s list.....	dis 7F	75¢
Climax Anti-Friction.....	dis 5F	75¢

Climax Steel Anti-Friction..... dis 50 1
Zenith for Wood Track..... dis 55 1
Reed's Steel Arm..... dis 5 1
Challenge, Harn D'Or..... dis 60 1
Steering (Anti-Friction)..... dis 5 10 1
Victor, No. 1, \$15; No. 2, \$10.50; No. 3, \$12..... dis 5 10 1
Cheritree..... dis 5 10 1
Kladder..... dis 10 10 1
The "Boss"..... dis 60 1
Best Anti-Friction..... dis 60 1
Duplex (Wood Track)..... dis 60 1
Tear's Patent..... dis 60 1
Crown's Patent, No. 1, \$12; No. 2, \$14.40; No. 3, \$18..... dis 5 10 1
Wood Track Iron Clad..... dis 10 10 1
Carrier Steel Anti-Friction..... dis 60 1
Architect..... dis 60 1
Ellipse..... dis 60 1
Felix..... dis 60 1
Richards..... dis 60 1
Lane's Steel Anti-Friction..... dis 60 1
The Ball Bearing Door Hanger..... dis 20 10 1
Warner's Patent..... dis 20 10 1
Stearns' Anti-Friction..... dis 20 10 1
Stearns' Challenge..... dis 25 10 1
Faulstich..... dis 25 10 1
Rider & Wooster, No. 1, \$24; No. 2, \$25..... dis 40 1
Paragon, Nos. 1, 2 and 3..... dis 40 1
Paragon, Nos. 5, 6, 7 and 8..... dis 40 1
Crescent..... dis 40 1
Nickel Cast Iron..... dis 50 1
Nickel, Malleable Iron and Steel..... dis 40 1
Scranton Anti-Friction Single Strap..... dis 35 1
Scranton Anti-Friction Double Strap..... dis 40 1
Universal Anti-Friction..... dis 40 1
Wild West, 4 in. wheel, \$15; 5 in. wheel, \$21..... dis 45 1
Star..... dis 4 10 1
May..... dis 50 1
Harness Snaps.—See Snaps.
Isaiah Blood.—List Jan. 1, 1888.
Hunt's Shingling Lath and Claw..... dis 40 1
Hunt's Broad..... dis 40 1
Buffalo Hammer Co..... dis 40 1
Hurd's..... dis 40 1
Fayette R. Plumb..... dis 40 1
Wm. Mann, Jr., & Co..... dis 50 1
Underhill Edge Tool Co..... dis 40 1
Underhill's Haines and Bright goods..... dis 35 1
C. Hammond & Son..... dis 40 1
Simmons..... dis 40 1
Peck's..... dis 40 1
Kelly's..... dis 40 1
Sargent & Co..... dis 60 1
Ten Eyck Footing Co..... dis 40 1
Collins, following list..... dis 10 1
Shingling, Nos. 1, 2, 3..... dis 5 10 1
Claw, Nos. 1, 2, 3..... dis 5 10 1
Lathing, Nos. 1, 2, 3..... dis 5 10 1
Hay Knives..... dis 5 10 1
Lightnings..... dis 5 10 1
Electric..... dis 5 10 1
Gem..... dis 5 10 1
Wadsworth's..... dis 5 10 1
Carter's Needle..... dis 5 10 1
Heath's..... dis 5 10 1
Hinges.—
Wrought Iron Hinges—
Strap and T..... dis 70 10 1
Screw Hook..... dis 30 1
Strap..... dis 30 1
Heavy Welded Hook..... dis 30 1
Screw Hook and Eye..... dis 30 1
Rolled Blind Hinges, Nos. 23 and 24..... dis 50 1
Rolled Blind Hinges, Nos. 23 and 24..... dis 50 1
Rolled Plate..... dis 70 10 1
Rolled Raised..... dis 70 10 1
Plate Hinges, 10 & 12 in..... dis 5 10 1
"Providence" over 12 in..... dis 5 10 1
Spring Hinges—
Steel's Spring and Blank Butts..... dis 40 1
Union Spring Hinge Co's list, March, 1888..... dis 40 1
Acme and U. S..... dis 40 1
Empire and Crown..... dis 40 1
Hero and March..... dis 40 1
American, Gem, and Star, Japanned..... dis 40 1
American, Gem, and Star, Bronzed..... dis 40 1
Oxford, Bronze and brass..... dis 40 1
Barker's Double Acting..... dis 40 1
Union Mfg. Co..... dis 40 1
Bommer's..... dis 40 1
Buckman's..... dis 40 1
Chicago..... dis 40 1
Gate Hinges—
Western..... dis 40 1
N. E. Revere..... dis 40 1
Clark's, Nos. 1, 2, 3..... dis 40 1
N. Y. State..... dis 40 1
Automatic..... dis 40 1
Common Sense..... dis 40 1
Seymour's..... dis 40 1
Shepard's..... dis 40 1
Reed's Latch and Hinges..... dis 40 1
Steel Hinges—
Parker..... dis 40 1
Palmer..... dis 40 1
Seymour..... dis 40 1
Nicholson..... dis 40 1
Huffer..... dis 40 1
Clark's, Nos. 1, 2, 3, 4 and 5..... dis 40 1
Clark's Mortise Gravity..... dis 40 1
Sargent's, Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13..... dis 40 1
Sargent's, No. 12..... dis 40 1
Reading's Gravity..... dis 40 1
Shepard's Noiseless Cl'gara Buffalo, Champion's
Steamboat, Clark's Old Pattern and Clark's Tip
Pattern..... dis 40 1
Shepard's O. S. Lull & Porter..... dis 40 1
Shepard's Acme Lull & Porter..... dis 40 1
Shepard's Queen City Reversible..... dis 40 1
Clark's Lull & Porter, Nos. 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100..... dis 40 1
North's Automatic Blind Fixtures, No. 3, for
Wood, \$10.50; No. 3, for Brick, \$13.50..... dis 40 1
Knees.—
Garden, Mortar, &c..... dis 40 1
Planter's Cotton, &c..... dis 40 1
Warren Hoe..... dis 40 1
Magie..... dis 40 1
D. & H. Scovill..... dis 40 1
Lane's Crescent Planter's Pattern..... dis 40 1
Lane's Razor Blade, Scovill Pattern..... dis 40 1
Maynard..... dis 40 1
Sandusky Tool Co..... dis 40 1
Hubbard & Co..... dis 40 1
Bare..... dis 40 1
Grab..... dis 40 1
Hoe, Rake and Hammers..... dis 40 1
Hill's Improved Ringers..... dis 40 1
Hill's Old Style Ringers..... dis 40 1
Hill's Tongue..... dis 40 1
Hill's Rings..... dis 40 1

Perfect Rings..... dis 40 1
Perfect Ringers..... dis 40 1
Blair's Box Ringers..... dis 40 1
Blair's Box Ringers..... dis 40 1
Champion Ringers..... dis 40 1
Champion Ringers, Double..... dis 40 1
Brown's Ringers..... dis 40 1
Brown's Ringers..... dis 40 1
Holding Apparatus—
"Moore's" Hand Hoist, with Lock Brake..... dis 40 1
"Moore's" Differential Pulley Block..... dis 40 1
Holders, File and Teel..... dis 40 1
Rais Pat..... dis 40 1
Nicholson's Holders..... dis 40 1
Hollow-Ware.—
Stove Hollow-Ware, Ground..... dis 40 1
Stove Hollow-Ware, Unground..... dis 40 1
Enameled and Tinned Hollow-Ware..... dis 40 1
Oval Boilers, Saucepans & Gilt Pots..... dis 40 1
Gray Enameled Ware..... dis 40 1
Asate and Granite Ware..... dis 40 1
Rustless Hollow-Ware..... dis 40 1
Galvanized Tea-Kettles—
Inch..... dis 40 1
Each..... dis 40 1
Silver Plated, 4 mo. or 5 1/2 oash in 30 days..... dis 40 1
Reed & Barton..... dis 40 1
Meriden Britannia Co..... dis 40 1
Simpson, Hall, Miller & Co..... dis 40 1
Rogers & Brother..... dis 40 1
Hartford Silver Plate Co..... dis 40 1
William Rogers Mfg. Co..... dis 40 1
Cotton..... dis 40 1
Bird Cage, Sargent's list..... dis 40 1
Bird Cage, Reading..... dis 40 1
Clothes Line, Sargent's list..... dis 40 1
Clothes Line, Reading list..... dis 40 1
Cellins, Sargent's list..... dis 40 1
Hangers, Reading list..... dis 40 1
Coat and Hat, Sargent's list..... dis 40 1
Coat and Hat, Reading..... dis 40 1
Wrought Iron—
Cotton..... dis 40 1
Cotton Pat. N. Y. Mallet & Handle W'ks..... dis 40 1
Tassel and Picture T. & S. Mfg. Co..... dis 40 1
Wrought Staples, Hooks, &c..... dis 40 1
Bench Hooks..... dis 40 1
Wire—
Wire Coat and Hat, Gem, list April, 1888..... dis 40 1
Wire Coat and Hat, Miles, list April, 1888..... dis 40 1
Indestructible Coat and Hat..... dis 40 1
Wire Coat and Hat, Standard..... dis 40 1
Belt..... dis 40 1
Grass..... dis 40 1
Sush..... dis 40 1
Whitmore Patent..... dis 40 1
Hook and Eye—Malleable Iron..... dis 40 1
Hook and Eye—Grass..... dis 40 1
Fish Hooks, American..... dis 40 1
Horse Nails.—
Nos. 6, 7, 8, 9, 10..... dis 40 1
Ausable..... dis 40 1
Clinton, Fin. 24 1/2, 25 1/2, 26 1/2, 27 1/2, 28 1/2, 29 1/2, 30 1/2, 31 1/2, 32 1/2, 33 1/2, 34 1/2, 35 1/2, 36 1/2, 37 1/2, 38 1/2, 39 1/2, 40 1/2, 41 1/2, 42 1/2, 43 1/2, 44 1/2, 45 1/2, 46 1/2, 47 1/2, 48 1/2, 49 1/2, 50 1/2, 51 1/2, 52 1/2, 53 1/2, 54 1/2, 55 1/2, 56 1/2, 57 1/2, 58 1/2, 59 1/2, 60 1/2, 61 1/2, 62 1/2, 63 1/2, 64 1/2, 65 1/2, 66 1/2, 67 1/2, 68 1/2, 69 1/2, 70 1/2, 71 1/2, 72 1/2, 73 1/2, 74 1/2, 75 1/2, 76 1/2, 77 1/2, 78 1/2, 79 1/2, 80 1/2, 81 1/2, 82 1/2, 83 1/2, 84 1/2, 85 1/2, 86 1/2, 87 1/2, 88 1/2, 89 1/2, 90 1/2, 91 1/2, 92 1/2, 93 1/2, 94 1/2, 95 1/2, 96 1/2, 97 1/2, 98 1/2, 99 1/2, 100 1/2..... dis 40 1
Essex..... dis 40 1
Lyra..... dis 40 1
Snowden..... dis 40 1
Futman..... dis 40 1
Tulcan..... dis 40 1
Northwest..... dis 40 1
Globe..... dis 40 1
A. C..... dis 40 1
C. B. K..... dis 40 1
Champion..... dis 40 1
New Haven..... dis 40 1
Sears..... dis 40 1
Champion..... dis 40 1
Campwell..... dis 40 1
Star..... dis 40 1
Anchor..... dis 40 1
Western..... dis 40 1
Empire Bronzed..... dis 40 1
Horse Shoes.—See Shoes, Horse.
Hose, Rubber, competition..... dis 40 1
Standard..... dis 40 1
Extra..... dis 40 1
N. Y. S. & P. Co., Para..... dis 40 1
N. Y. S. & P. Co., Extra..... dis 40 1
N. Y. S. & P. Co., Dundee..... dis 40 1
Huskers..... dis 40 1
Blair's Adjustable..... dis 40 1
Blair's Adjustable Clipper..... dis 40 1
Ice Picks, Chisels, &c.—
Am. Ice Chisel Pold..... dis 40 1
National Ice Chisel..... dis 40 1
Norway Ice Breakers..... dis 40 1
Dunlap's Ring Picks..... dis 40 1
Wood Head Picks, Sargent's..... dis 40 1
Iron Head Picks, Sargent's..... dis 40 1
Ice Mallets, Pick in handle..... dis 40 1
Ice Axes, Small Cast or Mail..... dis 40 1
Combination Ice Tools..... dis 40 1
Acme Ice Pick and Tongue..... dis 40 1
Roger's Lightning Ice Chisel..... dis 40 1
Ice Tongue..... dis 40 1
Champion, S. & S. & Co..... dis 40 1
Family..... dis 40 1
Jack Screws.—See Screws.
Kettles..... dis 40 1
Brass, 7 to 17 in..... dis 40 1
Brass larger than 17 inches..... dis 40 1
Enameled and Tea Kettles..... dis 40 1
Kettles..... dis 40 1
Lock Acorn list Dec. 30, 1888..... dis 40 1
Eagle, Cabinet, Trunk and Padlock..... dis 40 1
Hotchkiss' Brass Blanks..... dis 40 1
Hotchkiss' Copper and Tinned..... dis 40 1
Hotchkiss' Padlock and Cabinet..... dis 40 1
Ratchet Bed Keys..... dis 40 1
Kite Shavers..... dis 40 1
Parkin's Applewood Handles..... dis 40 1
Parkin's Rosewood or Cocobolo..... dis 40 1
Knives..... dis 40 1
Wilson's Fitcher Knives..... dis 40 1
Ames' Butcher Knives..... dis 40 1
Nichols' Butcher Knives..... dis 40 1
Ames' Shoe Knives..... dis 40 1
Picture Bread Knives..... dis 40 1
Moran's Shoe and Bread Knives..... dis 40 1
Hay and Straw..... dis 40 1
Table and Pocket..... dis 40 1
Door Mineral..... dis 40 1
Door Por. Jap'd..... dis 40 1
Door Por. Nickel..... dis 40 1
Door Por. Plated, Nickel..... dis 40 1
Drawer, Porcelain..... dis 40 1
Hemacite Door Knob, new list..... dis 40 1
Yale & Towne Wood Knobs, list Dec., 1885..... dis 40 1
Furniture P'ain..... dis 40 1
Furniture, Wood Screws..... dis 40 1
Base, Rubber Tip..... dis 40 1
Picture Bread Knives..... dis 40 1
Picture, Sargent's..... dis 40 1
Picture, Hemacite..... dis 40 1
Shutter, Porcelain..... dis 40 1
Carriage, Japanned..... dis 40 1

Ladies..... dis 40 1
Melting, Sargent's..... dis 40 1
Melting, Reading..... dis 40 1
Melting, Monroe's Patent..... dis 40 1
Melting, P. S. & W..... dis 40 1
Melting, Warner's..... dis 40 1
Lawn Mowers.—
Standard List..... dis 40 1
Enterprise..... dis 40 1
Lanterns..... dis 40 1
Tubular, Plain, with Guards..... dis 40 1
Tubular, Lift Wire, with Guards..... dis 40 1
Tubular, Square Plain, with Guards..... dis 40 1
Tubular, Square Lift Wire, with Guards..... dis 40 1
Without Guards, 25¢ a dozen less..... dis 40 1
Police, Small, \$5.00; Med. \$7.25; Large, \$9.75..... dis 40 1
Lemon Squeezers..... dis 40 1
Porcelain Lined, No. 1..... dis 40 1
Wood, Common..... dis 40 1
Dunlap's Improved..... dis 40 1
Sammis..... dis 40 1
Jennings' "Star"..... dis 40 1
The "Boss"..... dis 40 1
Dean's..... dis 40 1
Little Giant..... dis 40 1
King..... dis 40 1
Lines..... dis 40 1
Cotton and Linen Fish, Draper's..... dis 40 1
Draper's Chalk..... dis 40 1
Draper's Mason's Linen, \$4.75, No. 1, \$1.25, No. 2, \$1.75; No. 3, \$2.25; No. 4, \$2.75; No. 5, \$3.25..... dis 40 1
Cotton Chalk..... dis 40 1
Sammis, Cotton, No. 4, \$3; No. 4 1/2, \$3.50; No. 5, \$4..... dis 40 1
Silver Lake, Braided, No. 0, \$6.00; No. 1, \$6.50; No. 2, \$7.00; No. 3, \$7.50; No. 4, \$8..... dis 40 1
Hasson's Linen, No. 3 1/2, \$1.50; No. 4, \$2; No. 4 1/2, \$2.50; No. 5, \$3..... dis 40 1
Wash's "Linen" Cotton..... dis 40 1
Wire Clothes, No. 18, \$3.50; No. 19, \$3.00; No. 20, \$2.50..... dis 40 1
Ventilator Cord, 1/2 in. Braided, White or Drab..... dis 40 1
Locks, Padlocks, Cabinet Locks, &c.—
List Dec. 30, '86, chgd Feb. 2, '87..... dis 40 1
Note.—Lower net prices often made.
Mallory, Wheeler Co., list July, 1888..... dis 40 1
Sargent & Co., list Aug. 1, 1888..... dis 40 1
Reading Hardware Co., list Feb. 2, '88, dis 1.50; 60; 10; 15; 20; 25; 30; 35; 40; 45; 50; 55; 60; 65; 70; 75; 80; 85; 90; 95; 100..... dis 40 1
Livingston & Co..... dis 40 1
Perkins' Burglar Proof..... dis 40 1
Flax..... dis 40 1
F. M. Mfg. Co., Extension Cylinder..... dis 40 1
Barnes Mfg. Co..... dis 40 1
Yale Corrugated Key..... dis 40 1
Diets Flat Key..... dis 40 1
L. & C. Round Key Latches..... dis 40 1
L. & C. Flat Key Latches..... dis 40 1
Romer's Night Latches..... dis 40 1
Romer's Night Latches..... dis 40 1
"Shepherd" or "U. S."..... dis 40 1
"Felter" or "American"..... dis 40 1
Seed's N. Y. Hasp Lock..... dis 40 1
Cabinets.—
Eagle, Gaylord Parker and } List March, '84, revised
Corbin..... } Jan. 1, '84, dis 33 1/2
Delta, Nos. 36 to 39..... dis 40 1
Delta, Nos. 51 to 53..... dis 40 1
Delta, Nos. 56 to 59..... dis 40 1
Stoddard Lock Co..... dis 40 1
Champion "Night Latches"..... dis 40 1
Barnes Mfg. Co..... dis 40 1
Eagle and Corbin Trunk..... dis 40 1
Champion "Cabinet and Combination"..... dis 40 1
Yale..... dis 40 1
Romer's..... dis 40 1
List Dec. 23, '84..... dis 70 1
Yale Lock Mfg. Co. s..... dis 70 1
Eagle..... dis 70 1
Eureka, Eagle Lock Co..... dis 40 1
Romer's, Nos. 0 to 91..... dis 40 1
Romer's Scandinavian, &c, Nos. 100 to 506..... dis 40 1
E. Dietz..... dis 40 1
"Champion" Padlocks..... dis 40 1
Hotchkiss..... dis 40 1
"Star"..... dis 40 1
"Horse Shoe"..... dis 40 1
Barnes Mfg. Co..... dis 40 1
Rock's..... dis 40 1
Brown Patent..... dis 40 1
Scandinavian..... dis 40 1
Pratt's Pat. Scandinavian new list (Nov)..... dis 40 1
Lumber Tools.—
Ring Peavies, "Blue Line" Finish..... dis 40 1
Ring Peavies, Common Finish..... dis 40 1
Ring Socket Peavies..... dis 40 1
Mail Iron Socket Peavies..... dis 40 1
Cant Hooks, "Blue Line" Finish..... dis 40 1
Cant Hooks, Common Finish..... dis 40 1
"Ant Hooks, Mail Socket Clasp, "Blue Line" Finish..... dis 40 1
Cant Hooks, Mail Socket Clasp Common..... dis 40 1
Cant Hooks, Clip Clasp, "Blue Line" Fin..... dis 40 1
Cant Hooks, Clip Clasp, Common Finish..... dis 40 1
Sand Spikes..... dis 40 1
Pike Poles, Pike & Hook, 12 ft. 14 ft. 16 ft. 18 ft. 20 ft..... dis 40 1
Pike Poles, Pike only..... dis 40 1
Pike Poles not ironed..... dis 40 1
Setting Poles..... dis 40 1
Wand Hooks..... dis 40 1
Landing Blocks..... dis 40 1
Sliding Tongs..... dis 40 1
Log Bladders..... dis 40 1
Send Boot Calks, 1 to 5 in, dis 35 1/2; 5 to 10 in, dis 40 1
Square Steel Boot Calks..... dis 40 1
Chain Rafter Dogs..... dis 40 1
Rafter Dogs..... dis 40 1
Rafter Dogs..... dis 40 1
Timber Grapples..... dis 40 1
Ladders.—
Four-ounce Bottles..... dis 40 1
Mallets..... dis 40 1
Hickory..... dis 40 1
Iron Mallets..... dis 40 1
B. & L. Block Co., Hickory and L. V..... dis 40 1
Match Safes..... dis 40 1
Dangerfield's Self-igniting..... dis 40 1
Mattocks.—Regular list..... dis 40 1
Meat Outlets..... dis 40 1
Dixon's—Nos. 1, 2, 3, 4..... dis 40 1
Woodruff's..... dis 40 1
Champion..... dis 40 1
Hales' Pattern Nos. 11, 12, 13..... dis 40 1
American..... dis 40 1
Each..... dis 40 1
Enterprise..... dis 40 1
Nos. 10, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100..... dis 40 1

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THE IRON AGE

THURSDAY, SEPTEMBER 20, 1888.

The Harlow Automatic Lubricator.

A new form of lubricator, ingenious in construction, and positive and automatic in action, is at present being put on the market by Mr. Amos Aller, 109 Liberty street, New York. The engravings which we publish on this page, representing both general and sectional views, clearly explain

cup is filled with oil, and the quantity to be taken from this reservoir and delivered to any part of the machine to be lubricated, is determined by the use of the numbered wheel at left. This is more clearly shown in the vertical section, Fig. 2, the wheel there being marked A.

In Fig. 2 the outlet valve is marked D; F is a strainer over the suction chamber

cap; P, valve chamber; Q, nut and spring in lower part of valve chamber; R, valve; V, nipple, to screw into steam pipe.

Being operated by some moving portion of the engine or machine to be lubricated, the Harlow lubricator starts and stops with the engine or machine being lubricated, without requiring attention from the engineer or operator. The oil is fed to any

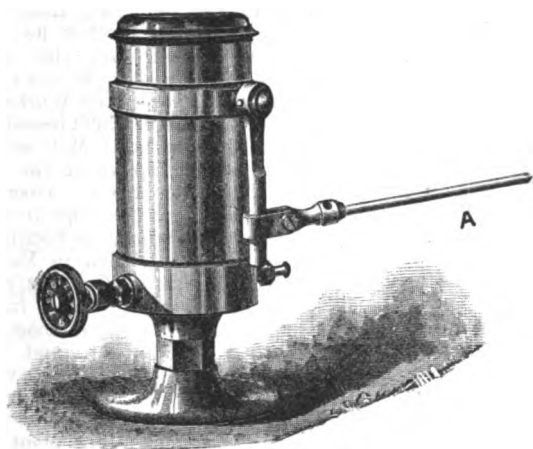


Fig. 1.—General View of Lubricator.

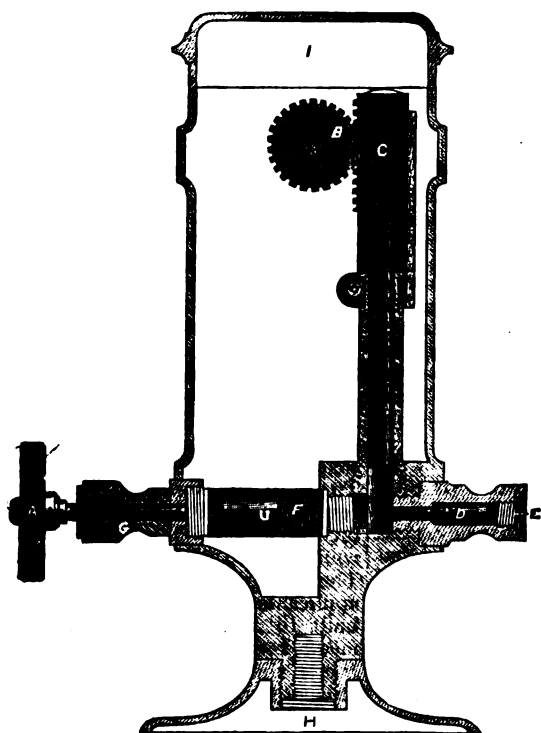


Fig. 2.—Vertical Section.

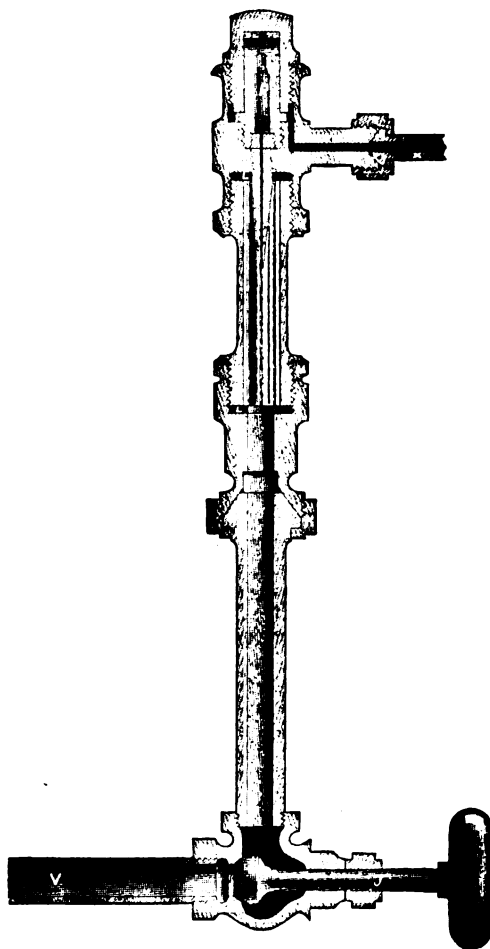


Fig. 3.—Vertical Section of Sight Feed.

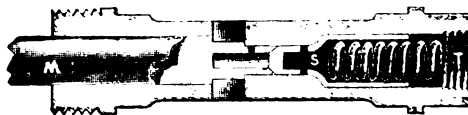


Fig. 4.—Enlarged View of Suction Chamber.

THE HARLOW AUTOMATIC LUBRICATOR FOR LOCOMOTIVE, MARINE AND STATIONARY ENGINES.

the arrangement of the device and its method of working.

An examination will show that the lubricator is practically a pump, worked through a rack and pinion combination, B C, seen in Fig. 2. The rod A in Fig. 1 receives its motion from some moving portion of the machine to be lubricated, and conveys this motion to the pump plunger within the reservoir cup. As the lever to which the rod is attached is hung on an axle, the rod may be carried to any desired angle to receive its motion. The reservoir

and U represents the suction port; H is a removable base. An enlarged view of the suction chamber is given in Fig. 4. In Fig. 3 we show a vertical section of the sight-feed, which, we need perhaps scarcely remark, is fitted in between the exit-pipe of the lubricator proper and the point at which the lubricant is to be delivered. The engraving explains itself, though, to be more explicit, we add the following reference letters: J, valve stem; K, union; U, packing for glass tube; MM, lock nuts; N, base, holding glass tube; O,

desired spot in perfectly regulated quantities, either in small drops at frequent intervals, or in large drops less frequently, or the oil may be delivered in a nearly continuous stream, at the pleasure of the operator. This regulated supply not only insures economy in oil, but gives an even, perfect and continuous lubrication. Any oil, thick or thin, if free from grit, may be used. The cup can be filled at any moment while the engine or machine being lubricated is in operation, without causing any leak either of oil or steam.

The device is not affected by varying temperature, and can be used in the most exposed situations without danger of freezing, as there is no water used in or about it. Its different parts are all made to gauges, so that in case of breakage they can be easily and quickly replaced.

Industries of Providence, R. I.

The Franklin Machine Company, better known as the old Franklin Foundry, has nearly completed the first of an order of five web perfecting printing presses, which is a new departure for these works, and, so far as known, for any machine works in this city. The work is being done for the Duplex Printing Press Company, of Battle Creek, Mich. The machine, which is 21 feet long and 4 feet 6 inches high, is intended to print 32, 64, 128 or 256 page pamphlets, fold, wire-stitch and cover them at a speed, for the smaller number of pages, of 80,000 copies per diem. In the stitching and covering alone one of these machines supplants over 100 girls, who did the work by hand. All the presses made by the Duplex Company have for their groundwork the inventions of the late Joseph L. Cox, and they bear his name. The new press appears to be quite simple. It has but one plate cylinder, flanked on either side by an impression cylinder of equal diameter. The paper is fed from a roll on a standard near the floor, and, as in the Bullock press, is cut before entering the machine. After having one side printed, the sheet, which entered on the right, is carried by tapes over the top of the press to the extreme left. Here it is carried down slightly until what was the rear edge is seized by the grippers of a platen cylinder and is presented to the plate cylinder at another part of its revolution, and the second side is printed. The sheet then goes off into a folder with adjustable guiding throat and double delivery, and is then folded as many times as may be desired, and stitched with steel wire. Another attachment still, in the form of a supplementary press, will print a cover and insert it at the proper place, to be finished up and folded with the pamphlet.

Mr. John H. Brown, a former resident of this city, has for the past eight years been at work perfecting a machine for the economical decortication of the fibers of tropical plants, valuable to the textile and paper making industries, and now has his machines in successful operation.

The Board of Assessors have completed a revaluation of city property, consisting of real and personal estate. The total is \$186,753,700, of which \$85,837,840 is personal, the increase over the preceding year's valuation being \$2,731,980. Among the persons and corporations taxed for more than \$50,000 are the following:

American Screw Company.....	\$1,048,520
Armington & Sims Engine Company.....	89,200
Amos C. Barstow and wife.....	534,080
Barstow Stove Company.....	94,960
Boston and Providence Railroad Company:	
Core street station.....	\$380,180
India Point station.....	141,580
Brown & Sharpe Mfg. Company.....	521,760
Builders' Iron Foundry.....	376,940
City Machine Company.....	127,940
George H. Corliss estate.....	59,960
Corliss Steam Engine Company.....	100,000
Franklin Foundry and Machine Company.....	397,520
William H. Harris Steam Engine Company.....	121,000
Household Sewing Machine Company.....	75,060
New England Butt Company.....	273,560
New York and New England Railroad Company.....	105,260
New York, Providence and Boston Railroad Company.....	164,120
Nicholson File Company.....	464,640
Phenix Iron Foundry.....	199,960
Providence Machine Company.....	153,500
	167,080

Providence and Worcester Railway Company.....	613,620
Rhode Island Locomotive Works.....	365,120
Slater Mill and Power Company.....	148,000
Thomas J. Hill.....	255,720
Rhode Island Tool Company.....	151,720

Mr. Benjamin Easton, Jr., Sheriff of Newport County, who, about two years ago, purchased the coal mine property in Portsmouth, R. I., but for agricultural rather than for mining purposes, is negotiating for the sale of the property to the Worcester Steel Works, who propose to utilize the mine. The mine has been abandoned for a number of years as impracticable to be profitably worked. The coal is not good for home consumption, but is considered of fair quality for smelting purposes, and it is for this purpose that the Worcester Steel Works propose to use it. They intend to begin at once, upon the completion of the purchase, the work of pumping out the mine, which will consume considerable time, as it has been abandoned so long that the shafts are practically filled up. It is possible that the company may transfer their works to the neighborhood of the mine, which would seem to be a more advantageous plan than the shipping of the coal mined to the present location of the works at Worcester. The sale is expected to be consummated in a few days.

Two of the railroads running into this city have introduced, to some extent, an improvement which, while it may not be noticed by one passenger in a hundred, nevertheless contributes to his comfort in a marked degree, and is a measure of safety and even of economy in the long run. It is probably known to all who use the railways that passenger cars are now coupled by what is known as a vertical plane drawbar, which has taken the place of the loose link and is now required by law in most States. This, with the accompanying buffers, makes a train practically solid, there being no slack between the cars to cause shocks in stopping and starting. The same reasons which dictated the close coupling between cars obtain with even more force in regard to the coupling between the tender and the head of the train. Some of the engines now working the Providence division of the Old Colony are from the company's former equipment and have the Miller coupler-hook on the back end of the tender, the same as on the cars, save that it is uncoupled by means of a hand wheel in place of the customary lever. The New York, Providence and Boston road has a hook-coupler handled by a small lever.

Some of the numerous inventions of the late George M. Cruickshank, of this city, are worthy of more than a mere mention. While it is generally known that he ranked high as a machinist it is probable that many, even those familiar with his line of business, never knew the fertility of his mind and the variety of his inventions. He was certainly one of the leading mechanics of New England, and his name was familiar in nearly every country in which steam is used for industrial development. His whole life was spent in the study of machinery, and it was said of him that he was able not only to understand the most intricate piece of mechanism, but also to suggest improvements, practicable and valuable. The peculiar ability was known and recognized throughout New England, and much of his time was spent in consultation with manufacturers, who seldom if ever were disappointed in obtaining the remedies solicited.

George Cruickshank was a born mechanic. He and his brother David came to this country in the hope of finding an enlarged field, and in less than five years after arriving in the United States George Cruickshank patented an invention which was immediately recognized as one of value by the engineers of both continents. While foreman of the Hope Iron Works he hit

upon a plan for doing away with hemp packing secured around the piston-rods of steam engines. In March, 1871, he introduced his "metallic packing," a contrivance as simple as it was effective, and 17 years of use have proved its incomparable superiority over the old method. It consisted of two rings, each cut into four segments, which fitted tightly to the piston-rod as it moved through them. The wear was taken up by spiral springs between the segments and an outside brass case. Power was gained by the lessening of friction, and when the rod vibrated the packing accommodated itself to every change of position.

Mr. David Cruickshank, now in business at 243 Dyer street, was then in Boston, working for the Fitchburg Railroad. At the request of his brother he came to Providence, to help put the improved packing on the market. It was first manufactured at the Hope Iron Works, but in January, 1872, the brothers leased Charles A. Mann's shop on North Main street, and formed a partnership under the name of William R. Smith & Co. George held the foremanship at the Hope Iron Works until June, 1872, when, his health failing, he went to join Mr. Smith in Europe, to see to the disposing of patent rights in Great Britain, leaving David in charge of the North Main street manufactory. He returned in October, and the following month they hired a room in the east end of the Dyer street building occupied by George at the time of the fatal accident. The plant was enlarged and the firm name changed to George M. Cruickshank & Co. In May, 1875, Mr. Smith withdrew, while David sold out his interest to George in the spring of 1880. But it was by the Shipman engines that Mr. Cruickshank was best known, and it can be said that his reputation was world-wide soon after he began their manufacture. Shipman was a Rochester (N. Y.) mechanic, who conceived the idea of generating steam with oil for engines of light power, but his plan, while possessing merit, was not well developed. Mr. Cruickshank followed up the idea, and produced a boiler that answered every requirement. For the first time oil was successfully used instead of coal under a boiler, and a brisk export trade followed the completion of the engine. Orders came from Australia, New Zealand, Argentine Republic, England, Germany, France, Sweden, Norway and Austria. A company was organized in Boston in 1885, and for a time Mr. Cruickshank was president, but soon resigned. The Shipman engines are used with good results on small river boats and in manufacturing establishments whose machinery could be run with 6 horse-power or less. The late George H. Corliss invariably sent applicants for smaller engines than he built to Mr. Cruickshank, and recommended the engines of the latter as the "best slide-valve engines in the world," an indorsement which was often accompanied by the opinion that the Dyer street machine-maker ranked among the most skilled and useful of American mechanics. LEONIDAS.

Professor Kolrausch has recently estimated the quantity of electricity in a flash of lightning. He finds that from 7 to 85 flashes would be required to keep an ordinary incandescent lamp alight for an hour.

In the race to Edinburgh last month some of the best running was performed on the North-Eastern Railway, England, by the compound engines designed by Mr. Worsdell. The engines in question have driving-wheels 6 feet 9 inches in diameter, with a high-pressure cylinder 18 inches, and a low-pressure cylinder 26 inches in diameter by 24-inch stroke.

The Mason Ingot Manipulator.

Among recent improvements in the steel works of the Bellaire Nail Works, at Bellaire, Ohio, is the establishment of an ingot manipulator, designed by Mr. Orland P. Mason, and serving the purpose of turning the ingot on the table and moving it into the desired position. The engravings which we present on this page explain the main features of the machine, which, it will be understood, is used in connection with a two-high mill.

In the rolling operation the ingot is fed to the rolls by means of tables having driven rollers on which the ingot lies, and by which it is moved backward and forward as it is passed to and fro through the rolls. During the operation it is frequently

the piston-rod I of the hydraulic cylinder is supported on grooved rollers, K. The operation of the machine scarcely requires explanation. The ingot having been placed on the rollers C is manipulated in the usual way until it becomes necessary to turn it. The rollers then bring it to a position which will enable it to be moved by the arms F. Steam or water is let into the cylinder J, moving the rack forward and turning the shaft D. This causes the arms F to catch the piece on its lower corner and turn it over. After turning, if it is desirable to move it still further, the rotation is continued in the same manner, and the piece may be moved to any desired position upon the table.

The machine is simple in construction, and, within certain limits, appears to be

vention and failure to patent. But as a matter of fact Jablochhoff had, as early as 1876, plated the carbons of his candles with copper; and though the invention had prior to that time been patented in France by Reynier, Jablochhoff disdained to recognize the Reynier patent, depending upon prior patents and publications; and it appears that Jablochhoff was right, since the Reynier patent was subsequently voided by the French courts, and held to be anticipated by a prior Carré patent and by Van Malderen's work in 1868. Bouliguine and Tchikoleff, also in Russia, plated their carbons, and published accounts of their practice.

The history of this feature of electric lighting is closely paralleled by many other features; and all other branches of

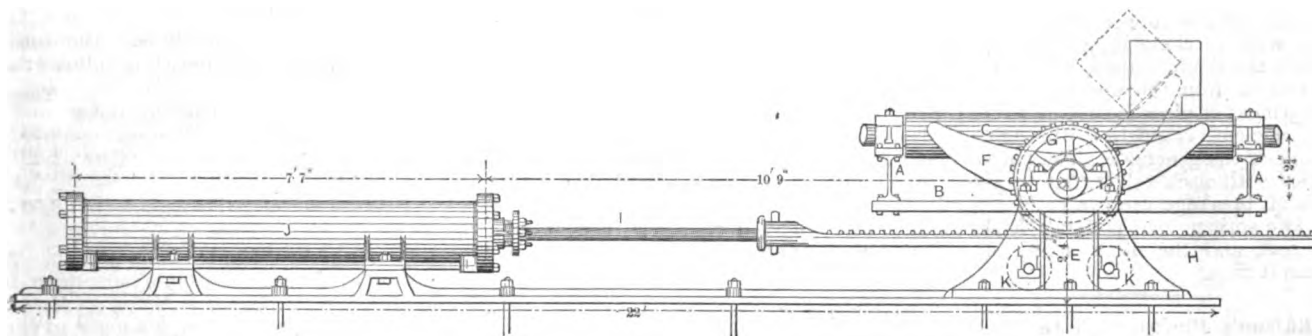


Fig. 1.—Side Elevation.

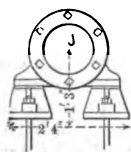


Fig. 2.—End Elevation.

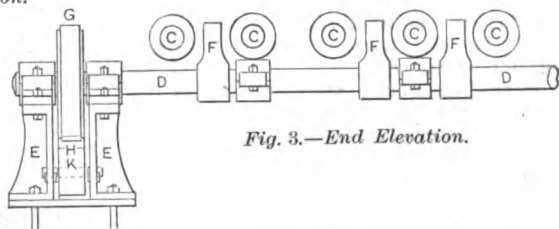


Fig. 3.—End Elevation.

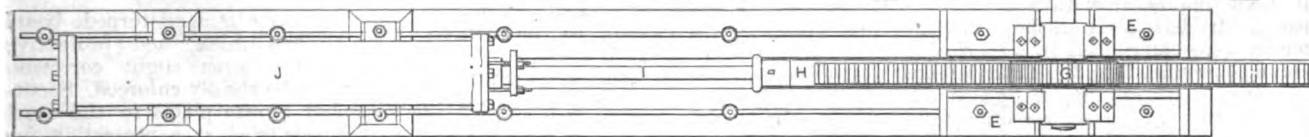


Fig. 4.--Plan.

INGOT MANIPULATOR AT THE BELLAIRE NAIL WORKS, BELLAIRE, OHIO.

necessary to turn the partially worked piece on its edge, and also to move it from one side of the table to the other. In case of a blooming mill making a variety of sizes, this work has always been done by hand. By Mr. Mason's arrangement this is accomplished by power.

The machine embraces a horizontal shaft, D, extending under the table rollers at right angles with the rolls. On this shaft five to seven arms, F, are placed, about 6 feet long. The shaft is revolved by a pinion, G, and rack, H, driven by a hydraulic cylinder, J. The arms F are curved on the upper side, and when revolved the points come up under the ingot and turn it over. A further revolution moves it into the desired position. The length of stroke of the hydraulic cylinder is such as to allow the shaft D, with its arms, to make one complete revolution. From Fig. 1 it will be noticed that the arms extend upward between the rollers C C. The rack H which is attached to

effective. Its economy consists in dispensing with the labor of two to three men on each turn. The principle appears to be correct, and only needs the trials of experience to perfect it.

Coppered Carbons.

Probably nearly every electric arc lighting company now electroplate their carbons. The *Electrical Engineer* says that in the dark ages of 1879 there was an interference in our much abused patent office between the two well-known inventors, Charles F. Brush and Moses G. Farmer, in relation to the coppering of electric light carbons, and it was held by Paine, commissioner, that Farmer had invented the process in controversy before Brush, but had also abandoned it, so that while priority was therefore awarded to Brush *pro forma*, the invention was thrown open to the public by Farmer's prior in-

applied electricity likewise disclose similar instances of anticipation. Electric lighting, however, is so old an art in itself, although commercially young, that inventors in this field cannot go far without running foul of something which had been invented (though very likely not much employed) years before.

Pictet's New Ice Machine.

One of the objects creating considerable attention at the Jubilee Exhibition at Vienna, is the new ice machine devised by M. Pictet, of Geneva, who has come to Vienna to personally superintend his exhibit and introduce this machine in Austria. In general principles the machine does not differ from others, but there are some important modifications in detail. Instead of using sulphurous acid, as in his previous machines, M. Pictet uses a mixture of sulphurous acid and carbonic acid,

to which we referred at greater length about a year ago, and which has received the name of "liquide pictet." The boiling point of this liquid under atmospheric pressure is at -19°C . and at a temperature of $+50^{\circ}\text{C}$. the pressure of the gas is only half that of pure sulphurous acid. The inventor has some theory, according to which there takes place an actual chemical combination of the molecules of the two gases when they are being liquefied under pressure, and it is due to this property that the work expended in compression is much smaller than in any other working agent. The "liquide pictet" is not inflammable, and can even be used for the extinction of fires. It has the further advantage of leaving a greasy dew upon the surfaces of the cylinder, piston-rod, valves, &c., rendering special lubrication unnecessary. The generator consists of a system of seamless copper pipes communicating with a chamber, at the bottom of which the liquid enters, while the gas is drawn off from the upper part. The arrangement of pipes is such as to facilitate an efficient circulation throughout the whole of the generator. The pump is provided with clack valves, but to avoid the risk of breakage each valve is controlled by two springs, one pressing it down on its seat, and the other acting as a stop when it rises.

Edison's Phonograph in England.

The expectation that Mr. Edison's phonograph would soon be rendered "loud-speaking"—capable, that is to say, of communicating its message to several hearers at once, without the intervention of tubes extending from the instrument to their ears—has already been abundantly fulfilled, according to the *London Times*. Colonel Gouraud received a large party of visitors recently, in order to exhibit to them the second instrument which he has received from America, and which, being furnished with a sort of speaking trumpet, from which its sounds issue, is distinctly audible to a large group of persons. It was accompanied by a set of cylinders carrying the traces of much talking, as well as of much vocal and instrumental music, and all these, when they were put into the machine, yielded up their record with truly marvelous fidelity. One cylinder had been impressed with the habitual noises of Mr. Edison's workshop, and the listeners were entertained by a succession of sounds produced in the first instance on an anvil, with sandpaper, by a sounding telegraph and in various other ways too numerous to mention. Another cylinder addressed the company in Mr. Edison's name and in his voice, while a third yielded up a song from Faust, and a fourth, "The Barefooted Friar," the traces upon all these having been made in America. Mrs. Shaw, the lady who is widely known as "La Belle Siffreuse," was among the company, and, after she had whistled to a cylinder, the phonograph was made to reproduce her notes with astonishing accuracy, and, presumably in consequence of the more intense character of the vibrations, much more loudly than those of speech or song.

Engine and Boilers of an Old Warship.

The *London Engineer* in a recent issue published a number of interesting engravings showing the arrangement of engines and boilers fitted on board the British warship *Terrible* in 1842:

The *Terrible* was the most powerful warship at that date. She was 1847 tons burden, with a length between perpendiculars of 226 feet and a breadth of beam of 42 feet 6 inches. The engines were of 500 nominal horse-power, and worked up

to about 2000 indicated power, with a pressure of steam of 7 pounds per square inch, the engines making 15 to 16 revolutions per minute. There were four cylinders, 72 inches diameter, with a stroke of 8 feet. The boilers were double-ended tubular boilers placed across the vessel and fired athwartships. They were four in number, two being placed forward and two abaft the engines; these were the first tubular boilers of large size that were fitted in an Admiralty vessel. There were in all 24 furnaces, with an area of fire-grate of 437 square feet, and 3360 tubes $2\frac{1}{2}$ inches diameter and 5 feet long, the boilers having altogether a heating surface of 12,700 square feet; each boiler weighed 26 tons. About the time that these engines were fitted a demand had arisen for engines of a lighter description than the old side-lever engines and that would occupy less space in the vessel. Among the different types that came into use at the time engines of similar description to those of the *Terrible* were among the most successful, and between the years 1841 and 1851 55 sets of these engines were fitted into vessels having a total power of 48,000 horses. The *Terrible* was always looked upon as a most successful vessel. Her sea qualities were fully tested during the fearful gale at Balacava on October 25, 1854, when the steamship *Prince* and so many other vessels were lost. On that occasion the *Terrible* towed a line-of-battle ship out of the Bay in the teeth of the gale into a place of safety. The type of engines built for and fitted in the *Terrible* was largely employed in the Italian, Russian, Spanish, Turkish and Danish navies, as well as the British.

Professor Clausius.

Germany's foremost physicist, Dr. Rudolph Julius Emanuel Clausius, died on the 24th and was buried on the 27th ult., at Bonn, on the Rhine. From the *London Engineer* we extract the following brief biographical sketch:

Dr. Clausius was born at Cöslin, in Pommerania, on the 2d of January, 1822, and finished his academical studies at Berlin, where he also began his teaching career as private tutor at the university, and was at the same time lecturer on physics at the Artillery College. In 1855 he was called as Professor of Physics to the Polytechnic school at Zürich, and was then installed there, in 1857, to the chair in the same science at the University. In 1867 he returned to his fatherland as professor at Würzburg, and lastly he joined the corps of professors at the Fried. Wilhelm University at Bonn, where he became one of its most distinguished ornaments. As an authority and teacher on the subject of heat he took a prominent rank. Clausius was the first to confirm and place the crude discoveries on the theory of heat promulgated by Dr. Mayer, of Heilbron, on a rigidly scientific basis in his treatise on the mechanical theory of heat, completed in two volumes in 1864 to 1867, the foundation of which he had laid at Zürich in 1857 in his popular treatise entitled "The Nature of Heat Compared with that of Light and Sound." Besides the above works he wrote the two books, "The Potential Function and the Potential" and "Concerning the two Chief Propositions in the Mechanical Theory of Heat." Most of our readers are so well acquainted with the important works of Clausius that it is unnecessary in announcing his loss to do more than to remind them of how great a part he took in building up the modern notions concerning the dynamical theory of heat and its convertibility into work. The deceased was a member of many scientific societies, both in his own and foreign countries, and was decorated with several royal orders. His manner of teaching was as exact as the

science he professed—firm and methodical—and he was popular for all that, among the students and his colleagues, and his loss will be for a long time felt as leaving a gap in his science not so easily filled, as he was a great master of the science he had taken up.

Weight of Torpedo Boats.

In a first-class torpedo boat, 135 feet long, with engines of 1400 I. H. P., as built for the British Navy, the general distribution of weight is about as follows:

	Tons
Hull and fittings.....	40
Machinery.....	34
Armament.....	8
Coal.....	10
Stores, equipment and men.....	12
Displacement.....	104

In a second-class torpedo boat the total weight would be distributed as follows:

	Tons
Hull and machinery, including water in boiler.....	9.25
Coal.....	1.50
Stores, equipment and men.....	1.75
Displacement.....	12.50

Tinning by Simple Immersion.—A method of tinning by simple immersion is described by *L'Écho des Mines et Métallurgie*. Argentine, it says, is a name given to tin precipitated by galvanic action from its solution. This material is usually obtained by immersing plates of zinc in a solution of tin containing 6 grams—about 90 grains—of the metal to the liter—0.88 quart. In this way tin scrap can be utilized. To apply the Argentine according to M. P. Marino's process, a bath is prepared from argentine and acid tartrate of potash rendered soluble by boric acid. Pyrophosphate of soda, chloride of ammonium, or caustic soda may be substituted for the acid tartrate. The bath being prepared, the objects to be coated are plunged therein, first having been suitably pickled and scoured, and they may be subjected to the action of an electric current. But a simple immersion is enough. The bath for this must be brought to ebullition, and object of copper or brass or coated therewith may be immersed in it.

The skin plating in many torpedo boats is only $\frac{1}{16}$ inch thick, and protective measures against even slight corrosion must therefore be rigidly enforced. Securing phosphor bronze plates to the steel frames has been tried as a protection for the bottom plating, but on the whole an efficient inspection system has been found most satisfactory. According to the British Admiralty regulations all boats in use must be docked for inspection every two months, and in addition the decks are covered with a specially prepared cement.

The call for draft regulators on locomotives shows that the old practice of throwing open the fire-box door when an engine was making steam too freely is no longer satisfactory. A nozzle that will make an engine steam freely while working hard and slow will exert very little effect on the fire when the engine is passing out a small volume of steam expanded down toward the atmospheric line. On the other hand, when the nozzle is made small enough to cut the fire when the engine is working light, it will tear the fire when working slow. Air openings have, therefore, been applied to the bottom of the smoke-boxes, and with good results. They are covered by sliding plates, operated from the cab. The device is easily worked and there is almost no danger from the escape of sparks through the openings.

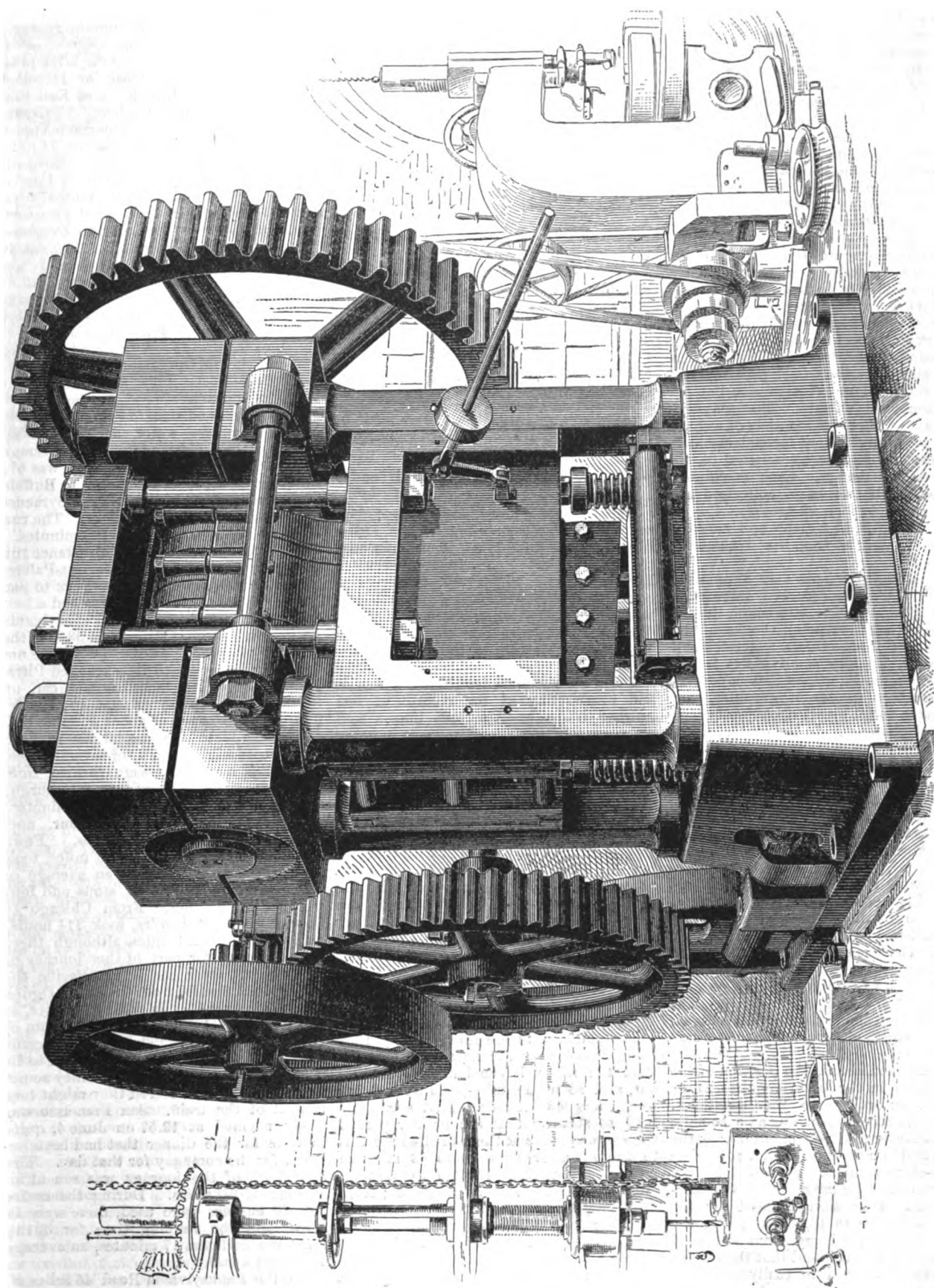
Forty-Ton Shear.

We take pleasure in presenting on this page an engraving of a large shear built by Messrs. B. W. Payne & Sons, of Elmira, N. Y., for the Elmira Rolling Mill Company, and now in regular work. The

as guides for the shear ram. The eccentric shaft is 10 inches in diameter at the ends and 14 inches through the eccentric, and carries a large gear-wheel shown at the right in the illustration. It will be observed that the machine is double geared, being driven from the back shaft which

The shear weighs about 40 tons, and has a capacity to shear plates $2\frac{1}{4}$ inches by 36 inches.

For the first time in some months there is a scarcity of cars in the Connellsville coke region. The outlook for relief in the



FORTY-TON SHEAR, BUILT BY MESSRS. B. W. PAYNE & SONS, ELMIRA, N. Y.

design is at once suggestive of great solidity and strength, the tool being intended for heavy work, and the various parts accordingly being of massive proportions. A very heavy base is provided, from which rise four wrought-iron columns, 7 inches square. Those support two massive boxes, which, in turn, carry the eccentric shaft. The columns also serve

carries the heavy balance-wheel at the left. The ram, mentioned above, carries the upper shear blade, while the lower one is fastened to the base. The sides of the ram have adjustable gibbs, which are fitted accurately to the square columns and serve the purpose of maintaining perfect alignment of the ram as it is carried up and down. A 12-inch belt supplies the power.

near future is not good, in view of the fact that shipments of corn will commence in a short time. This will necessarily divert a great many more cars, and it is expected the consequence will be an advance in the price of coke. The yards in the region are now being stocked up, and it is impossible to get cars to move the product.

Aluminium Alloys by the Heroult Process.

The Swiss Metallurgical Company, of Lauffen-Neuhausen, Canton Schaffhausen, Switzerland, is engaged in successfully producing alloys of aluminium on a large scale, making use of the Héroult patent process. This process, according to the *Engineering News*, consists in melting down certain refractory metallic compounds by the electric current and with the aid of certain electrodes, and in subsequently reducing the metals contained therein by electrolysis. The negative electrode is here the metal to be alloyed to aluminium, as copper, iron, tin, the positive electrode being the carbons immersed in the molten alumina.

The current is supplied by two dynamos, each of 6000 amperes and 20 volts, driven by a 300 horse-power Jonval vertical turbine, while a separate dynamo of 300 amperes and 65 volts is used as an exciter. The main difficulty to be overcome by the projectors of these works was the production of a current powerful enough for the work to be performed. The enormous dynamos designed for this purpose were constructed at the Oerlikon machine works, Switzerland. They make but 180 revolutions per minute. The magnetic field, having six poles, consists of a single casting weighing 11 tons for each machine. The armature used is constructed on the Brown patent design. Each machine is furnished with two large collectors and contains not less than 72 brushes. Copper cables of the size of a man's arm serve to conduct the current from the dynamos to the furnace.

The melting takes place in a crucible, or basin, of electrical carbon surrounded by a metallic wrapping into which the current enters (negative pole), the basin thus forming part of the circuit. Metallic copper, broken up into small pieces is first placed in the basin, which is then covered up by means of plates of graphite, care being taken to fill up all open joints with powdered charcoal. In the center of the graphite cover, a space is left for the introduction of the suspended carbon slabs to which the positive cable is affixed. The carbons are then lowered toward the copper, which is soon melted by the current passing through it. Alumina is now added to the copper through locks arranged for that purpose, while the carbons are somewhat raised. The current passing through the alumina melts and reduces the same, the oxygen burning the carbon and escaping as carbonic oxide gas, while metallic aluminium becomes alloyed with the molten copper. By drawing back a carbon stopper, the contents of the basin may now be emptied out into a ladle or ingot. The basin is then recharged after the manner above described, making the process a continuous one.

As mentioned above, the position of the carbon slabs in the basin requires to be regulated according to the resistance. This may be accomplished by an automatic device in the form of a chain holding up the carbons and is connected with a reversible dynamo-electro motor regulated by the amperemeter. The intensity of the current found to be best adapted for the process is 12,000 to 13,000 amperes, the electro-motive force being from 12 to 15 volts, though it was found that the output of the dynamos could be easily increased to 25,000 amperes without causing any disturbance to the same. The same process may be followed for obtaining all other alloys of aluminium, excepting those metals which become volatilized at the melting point of aluminium. Mixed alloys, too, may be directly produced by this method—i. e., copper, silicon and aluminium, by melting down clay containing silica as well as alumina.

The capacity of the plant above described is stated to be 660 pounds of aluminium per day, or 6600 pounds of bronze containing 10 per cent. of aluminium. The heats may be continued day and night for months without stopping. A series of tests, made by Professor Tetmajer, of the Polytechnikum at Zürich, illustrating the high tensile strength and ductility of the products of these works, will be of general interest to our readers:

Metal.	Tensile strength (in pounds per square inch).	Elongation (per cent).
Aluminium bronze "A".....	49,200	25.4
" " "B.....	54,600	27.4
" " "C.....	51,760	34.3
" " "D.....	68,200	37.5
" " "E.....	73,380	39.2
" " "F.....	79,630	23.0
" " "G.....	88,300	18.5
" " "H.....	91,000	7.0
Aluminium Brass.....	68,400	20.7
* Gun steel.....	78,200	14.0
* Wrought iron.....	54,000	22.0
* Delta metal.....	54,000	20.0
* Common bronze.....	32,700	8.0
* Phosphor bronze.....	41,240	17.0
* Manganese bronze.....	41,240	17.0
* Durala metal.....	51,200	22.0

* The tests marked thus * were made by Professor Tetmajer for the purpose of verification.

Fast Time on American Railroads.

The liveliest interest was manifested by railroad men in the account of the recent race between the Flying Scotchman and the West Coast Flyer from London to Edinburgh, in which 400 miles were covered by the winner in 7 hours and 25 minutes. This was an average of something over 53½ miles per hour. The New York Times referring to the event at the time said:

There was a general jogging of memories and overhauling of the records of fast railroad trains on American lines. And much comfort was found by many in going over those records. For they show that although the British and French roads admittedly make much better time habitually than is made on any of the American lines, some astonishing and sustained rates of speed have been attained here, when special efforts were expended with that end in view. The best run on record in this country which can be fairly compared with the English run was made over the West Shore Road from Buffalo to New York on July 9, 1885, when 426 miles were covered in 7 hours 27 minutes. Quite a large number of railroad men, including officials of the Baltimore and Ohio, Wabash, Grand Trunk, and West Shore roads happened at Buffalo together en route for New York. It was decided to see how quickly they could move over the new road. At the start the railroad men had their watches out, and soon the mile-posts were flying past every 43 seconds. That speed was held so steadily that the greater part of the run was made at the rate of 45 seconds to the mile, or from 70 to 83 miles an hour. From East Buffalo to Genesee Junction, 61 miles, took 56 minutes; from East Buffalo to Newark, 93.4 miles, 97 minutes; from Alabama to Genesee Junction, 36.3 miles, 30 minutes. The 97 minutes to Newark included stops of 9 minutes, making the actual running time for the 93.4 miles, 88 minutes. From Newark to Frankfort, where the conditions for running were not so good as before, the run of 108.3 miles was made in 134 minutes, including 17 minutes for stops. From East Buffalo to Frankfort, 202 miles, the time was 240 minutes, of which 35 minutes were consumed in stops. There was only a single track at that time on the road a good part of the way between

Buffalo and Syracuse, and that journey had to be made at reduced speed, especially over the switches. The journey was timed with the utmost care for the purpose of tabulation. In the table there are marked several miles which were made at the speed of 78 miles an hour, one at 84 miles, and the next, between Genesee Junction and Chili, at 87 miles. New engines took the train at Buffalo, Newark, Frankfort and Coeymans.

On October 8, 1885, over the same road, a burst of speed was tried for 11 miles, between Genesee Junction and East Buffalo, to satisfy Superintendent J. E. Layng, who was on the train. The run occupied 512 seconds, an average rate of 74 miles an hour. Three of the miles were made at the rate of 80 miles an hour, 1 at 77, and 1 at 75. On the New York Central Road a newspaper train with two cars, weighing 60 tons, hauled into Syracuse, Sunday morning, August 8, 1886, at 10 o'clock, an hour late. The train was booked to go from New York to Buffalo in 9½ hours. Orders came to try to make up the time on the further run of 148.7 miles to Buffalo. John W. Cool, one of the best engineers on the road mounted his cab, bound to obey the order. He started out at 54½ miles an hour. At the end of 3 miles his speed increased to 66 miles an hour and then to 74½. He stopped at Rochester for water, and slowed up after passing Crittenden. His average speed from Syracuse to Rochester was 67½ miles per hour, from Rochester to Buffalo 63.72 miles per hour, and from Syracuse to Buffalo 65.6 miles an hour. The run of 148.7 miles was made in 136 minutes.

The most remarkable long-distance run on record was when the Jarrett-Palmer combination went from New York to San Francisco in half time, or three and a half days. Their train left the Pennsylvania station in Jersey City at 12.53 on the morning of June 1, 1876. They were not to make a stop until they reached Pittsburgh. An engine and baggage car, on the approach of the special to Harrisburg got up a speed of about 50 miles and passed mails to the special by running along an adjoining track for several miles, while the mail bags were thrown from train to train. The run to Pittsburgh, 438½ miles, took 10 hours and 5 minutes, an average of 43½ miles an hour, notwithstanding the Alleghenies. From Pittsburgh to Chicago, 458.3 miles, took 11 hours and 6 minutes, an average of 42.1 miles, including 25 stops and four changes of engines. From Chicago to Council Bluffs, 491 miles, took 11½ hours, an average of 42.6 miles, although there was a record for part of this journey of 62.2 miles. Over the Union Pacific the run of 1032.8 miles from Omaha to Ogden was made in 24 hours and 14 minutes, at an average of 41 miles, and a maximum of 72 miles an hour. The brakes became worn at Ogden and hand brakes had to be used, retarding the onward journey somewhat, as the men feared they might lose control of the train. San Francisco was safely reached at 12.57 on June 4, quite in time for the dinner that had been ordered for the company for that day. The last stage of the journey was run at an average of 37 miles. During the entire run 20 engines were used, there were 72 stops, and the running time for 3313½ miles was 84 hours 17 minutes, an average of 40 miles an hour.

On the Pennsylvania Road 45 miles an hour is not uncommon, and there are level stretches where a speed of a mile a minute is attained. Samuel Carpenter, the general agent of the road for this city, said yesterday that if there was any need of making time to compare with the new English schedule it could be done. On the New York Central Road the run of 80 miles from Rochester to Syracuse has been made in 80 minutes when it was necessary

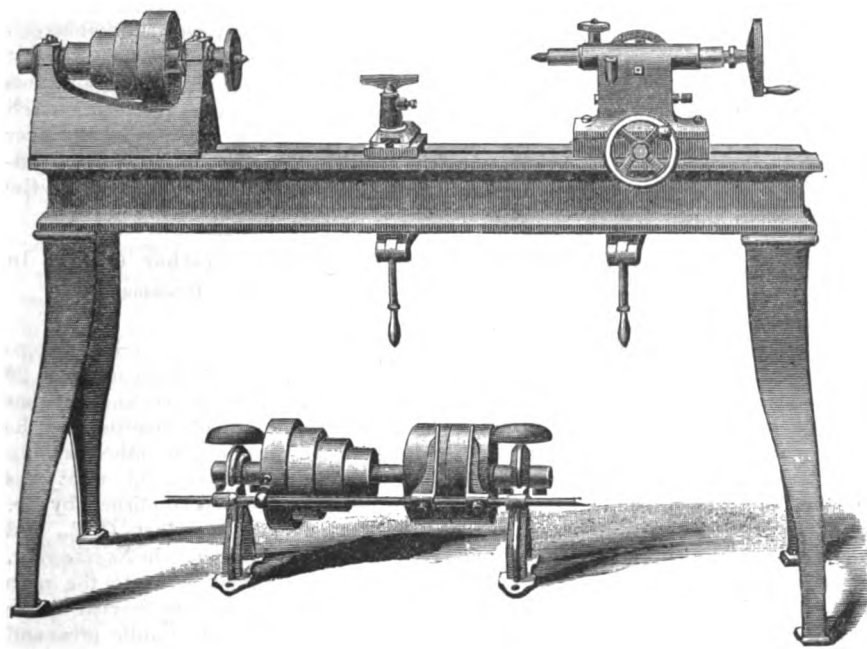
to make up lost time. Assistant Superintendent Voorhees of the New York Central said that he stood ready any day to send a party from New York to Buffalo, 440 miles over that road, in the same time

and keeping the platform in place. The levers are arranged in tandem style, so that the machine will take up as little room as possible and allow a clear deck for transverse tests. As the size of this com-

The Coke Trade.

The recent improvement in the coke trade still continues, and the present outlook for that industry is better than for some months past. The demand continues to grow in sympathy with the recouping iron market. The pig iron situation has not been more encouraging for months past, and the improvement is specially noted in the West where coke is used almost exclusively as fuel. With the improved demand for coke and the consequently increased shipments, a scarcity of cars is already being experienced by the operators. The shortage has been growing more and more marked for some time past, and, unless a decided change soon takes place, it is feared that a veritable car famine will occur. The estimated output for the week ending on September 8th was 100,365 tons, against 103,974 tons for the previous week. The falling off is due to the idleness of a large works, in the region where a strike is in progress. From the same cause the active ovens have also decreased from 10,103 to 9837, leaving 3241 still idle. The shipments for the week aggregated 5850 cars distributed as follows: To Pittsburgh and suburban points, 1220 cars; to Western points, 3130 cars; to points East of the Connellsville region, 1500 cars. The shipments for the previous week were as follows: Pittsburgh, 1250 cars; West, 3550 cars; East, 1750 cars; total, 6550 cars. The large falling off in shipments East and West is due chiefly to the scarcity of cars coupled with some petty strikes.

The French Government will not recognize Greenwich, and have resolved to fix one uniform time for the whole of the country. This will be "Paris time," which for the future will be adopted in railway stations and public places all over France, and it is to be called *l'Heure Nationale*. On the frontiers, however,



HIGH SPEED LATHE, BUILT BY CHARLES H. BESLY & CO., CHICAGO, ILL.

made by the English racer for 400 miles, if the party would pay \$2 a mile to get there in 7 hours and 25 minutes.

New Speed Lathe.

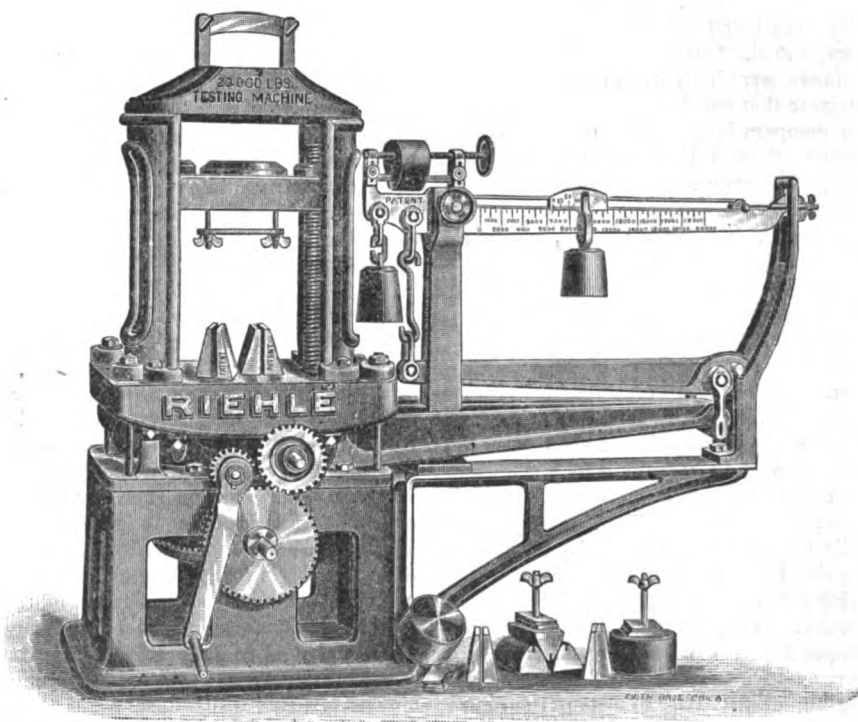
We show on this page a new speed lathe which is being put on the market by Messrs. Charles H. Besly & Co., 175-177 Lake street, Chicago, Ill. This lathe is designed to meet the wants of brass-workers and light metal workers. It has a 5-foot bed, swings 15 inches, weighs 600 pounds and has a hollow spindle with a $\frac{1}{8}$ -inch hole. The live spindle is of steel running in babbitt-metal boxes. The front bearing is $1\frac{1}{2}$ x 3 inches. The cone has four grades of speed for a 2-inch belt. The tail-stock has a set-over and a quick-return spindle. The countershaft has tight and loose pulleys, 7 x 2 $\frac{1}{4}$ inches, and should make 250 revolutions per minute. The lathe is well made in every respect and the wear is evenly distributed over the frictional and strained parts.

New Testing Machine.

Messrs. Riehle Brothers, Philadelphia, Pa., are turning out a new and improved screw-power testing machine for tensile, transverse and compression tests, combining the elements of accuracy, speed and facility in handling. The engraving which we annex explains the construction.

The machine is constructed of the best materials and the levers adjusted to the standard weights of the United States Government. There are three different speeds for testing a specimen and also for driving in the opposite direction. This allows of all the possible requirements of a wide range of material. There are no loose weights, and a single traveling poise, operated by a light hand-wheel, registers the strain accurately by means of a vernier. The power is applied by a crank with loose sleeve handle. Tools are furnished with the machine for making the various tests, and there are stops and holders for the grips, &c., as well as bolts and cushions for checking the recoil

of the machine is not very great, it is advisable to mount it on a solid wooden platform, from 16 to 18 inches high, so as to bring the crank and beam to a convenient working height, and made to suit the size of the machine base. The crank can be slipped on any of the three key-end shafts, and thus secure three changes of speed in testing. On stopping the crank



NEW TESTING MACHINE, BUILT BY MESSRS. RIEHLE BROS., PHILADELPHIA, PA.

the machine will maintain the pressure on the specimen as long as desired. The machine is being built in the following sizes: 10,000 pounds, 20,000 pounds, 30,000 pounds, 60,000 pounds, 100,000 pounds and 200,000 pounds capacity, and can be built of increased capacity on order.

both the national hour and the foreign hour will be shown by the official clocks. At the present moment three different systems of marking the time are in vogue in France. The new system will come into operation at the opening of the Universal Exhibition.

The Iron Age

New York, Thursday, September 20, 1888.

DAVID WILLIAMS, - - - PUBLISHER AND PROPRIETOR.
CHAS. KIRCHHOFF, JR., - EDITOR.
GEO. W. COPE, - - - ASSOCIATE EDITOR, CHICAGO.
RICHARD R. WILLIAMS, - - HARDWARE EDITOR.
JOHN S. KING, - - - BUSINESS MANAGER.

Protection and Progress—III.

The unprecedented economic disturbances of the last 20 years which, as Mr. Wells has so well shown, have furnished by all odds the greatest industrial force of the civilized world during that period, have been, as he also proves, the result of scientific inventions and applications of natural forces and resources. In other words, they are incidents of a progress which has become, in these latter days, so much more rapid and wide than ever before as to constitute a new element in economical science. The difference in degree practically amounts to a difference in kind. One consequence of this fact is the invalidation of many of the economic formulas worked out from data in which the element of progress was but slightly considered, if considered at all. The chance, for instance, that capital invested in buildings, ships, plant and all the machinery of trade, would be destroyed prematurely by world-wide changes due to new discoveries or improvements has not usually been taken into consideration in estimating the inducements and rewards of such investments.

Mr. Wells tells us that after the wholesale destruction of values in sailing vessels, occasioned by the opening of the Suez Canal, three successive fleets of steamers were built within a few years to navigate that canal, each new type rendering comparatively worthless all its predecessors, though these were still nearly new. The replacement of the paddle by the screw in ocean navigation was a similar process, but far less rapid, and hence incidentally less disastrous. The feature of the progress of to-day which we desire to emphasize is its instantaneous and catastrophic character. The actions and reactions of the "laws of trade" have been studied and formulated without much regard to this factor of time. A favorite figure with economists has been that of a fluid "seeking its level," and their favorite maxim has been, "Let it alone, to find its level." The picture in their minds has been that of a pond, augmented by some gentle wave at one side, adjusting itself under the influence of gravity. They have not realized that tempests and tidal waves and headlong torrents are also cases of a fluid "seeking its level." Or, to change the figure slightly, they have calculated the effect of this or that way of steering in a slow current and safe channel, and concluded that the best course is to drift. But they have not realized that the regimen of the stream has changed, and that violent freshets are continually changing even the channel.

Now, it is the function of tariff protection, not hitherto sufficiently recognized, to modify and retard the incidental disasters of industrial progress. As we have

already shown, protection mightily stimulates the international exchange of ideas, which is the chief element in this progress. We have now to add that while this helps to make a new improvement known at once throughout the civilized world, it tends, at the same time, to break the disastrous force of the consequent changes or revolutions of industry. American manufacturers, for example, get the knowledge of great improvements in manufacture, not in the form of a sudden ruinous competition, the means of which are perhaps secret to them, but in the form of descriptions, which may guide them in improving their own methods. This gives time for the inevitable change which home competition is certain to bring about. An extreme instance of protection—going much further than it would be (for reasons not now under consideration) advisable to go in general—is furnished by our navigation laws, which are absolutely prohibitory. But, for the point we are now presenting, this extreme case affords a striking illustration. For we owe it to our navigation laws that American ship-owners did not share in the ruin which the completion of the Suez Canal brought upon English ship-owners. The direct import of that tidal wave did not reach our shores at all. The innumerable vessels thrown out of use by that event were not permitted to work sudden disaster to our coasting trade.

To sum up our line of thought, progress is not only inevitable, but beneficial. Ultimately (and, indeed, sooner than pessimists believe), it benefits all classes—the manual laborers most of all. But it is attended with great disturbance and friction, and hence with much incidental distress and loss. It is the part of statesmanship to reduce these as much as possible and not wholly to sacrifice the present to the future. Violent changes in industry are to be deprecated, even when they are in the nature of ultimate benefits. The change may be a good thing; the suddenness and violence of it are not good. Stability is a blessing, too. And a wise protective tariff may so operate as to regulate, while it actually stimulates, the forces of progress.

The coming winter promises to be a busy season with shipbuilders on the lakes. The summer has been fairly profitable for the vessel owners, whose lines have been well employed at good rates, and the increasing iron ore shipments now cause them to feel very hopeful of the prospects for next year. Under such conditions they will not hesitate to replace old vessels with better ones, and to add new vessels to existing lines. Some contracts have already been placed with shipbuilders and more are under negotiation. The use of iron and steel in lake shipbuilding increases every year, and some of the wooden shipyards in Michigan will soon add plants for the construction of iron and steel vessels, recognizing the tendency of the times. The steel vessels now in use on the lakes have won for themselves a high reputation for speed and endurance. A short time since one of them was driven by a storm on the Government breakwater outside of the harbor of Chicago, and the receding waves left it with almost half its length projecting in the air. The officers expected it to go to pieces under such a

severe strain, but tugs were secured from Chicago as quickly as possible which pulled it back into the water. It was then dry-docked and found to be injured but slightly. The quality of the work turned out by American shipbuilders both on the lakes and on the seaboard is most excellent, and notwithstanding the gibes of callow statesmen, we are making progress in this branch of industry every year which will count heavily in our favor whenever the conditions are propitious for our entrance into the race for supremacy on the ocean.

The Friction of Leather Collars in Hydraulic Presses.

Since the time of the experiments conducted by Mr. John Hick, more than 20 years ago, nothing that we know of has been done in the line of investigating the friction of cup-leathers and other packing in hydraulic presses, except what has quite recently been accomplished by Mr. J. E. Tuit, Assoc. Mem. Inst. C. E., and recorded a short time since in *Engineering*. Trustworthy information as to the ratio between the gross pressure exerted by the liquid contained in a hydraulic press and the useful pressure transmitted by its piston was, in fact, entirely lacking previous to Mr. Hick's experiments, the only published figures probably being those given by Professor Rankine in his admirable treatise on "The Steam Engine." These, however, place the friction between a plunger and its collar at about one-tenth of the total effort of the water on the plunger, or somewhere between one-ninth and one-eleventh, values which not only seemed much too high, but which evidently could not be applied to plungers of varying diameters without the chance of introducing serious errors, the diameters obviously having a direct bearing on the results. It was probable, moreover, that the friction of a properly designed and constructed cup-leather packing was much less than in the case of any form of packing of which the tightness and coefficient of friction depended upon the behavior of that uncontrollable variable, a man with a monkey-wrench. Mr. Hick's investigations appeared to give ample proof of all this, and his results are even now, though not of undisputed accuracy, as it would seem, entitled to careful consideration, having been arrived at by a series of tests in which neither trouble nor expense was spared to insure reliability. We cannot undertake to supply here in detail the trial figures which he obtained, but annex a table which gives, in a compact and convenient form, the frictional resistance in percentage of the total hydraulic pressure for rams ranging from 2 inches to 20 inches in diameter. It was within these limits to size that the experiments were made.

Dia. of ram inches.	Friction per cent.	Dia. of ram inches.	Friction per cent.
2	2.00	13	0.33
3	1.33	13	0.30
4	1.00	14	0.28
5	0.80	15	0.26
6	0.66	16	0.25
7	0.57	17	0.23
8	0.50	18	0.22
9	0.44	19	0.21
10	0.40	20	0.20
11	0.38		

The great reduction in these friction values as compared with Professor Rankine's estimates is at once apparent, and is

quite striking. It will be noticed also in the table that the coefficient of friction diminishes rapidly as the diameter of the ram increases, a circumstance which Professor Rankine seems to have ignored entirely in his investigations, but which exerts a most important influence in arriving at the efficiency of a press.

It is interesting now to compare with these figures the results obtained by Mr. Tuit as noted above. Mr. Tuit experimented with six different forms of presses, the plungers ranging from 4 to 14 3/8 in. in diameter. Two of the presses were furnished with cup-leathers both at the top of the cylinder and lower end of the plunger; two others had cup-leathers at the lower end of the plunger only; the fifth had a cup-leather in the plunger, and a stuffing-box with packing fitted to the cylinder, while in the sixth there was no cup-leather, a stuffing-box with packing alone being employed. The presses were marked respectively D, E, A, B, C and F. In some of the trials a strip of iron was introduced on one side between the upper surface of the ram and the plate against which it was pressing, thus representing a load not coinciding with the axis of the ram. From the table of results obtained, we extract the following figures:

unless we attribute the variation in the results in a great measure to personal equation. With even an extremely liberal allowance for this, however, the results should show better agreement. It is not the varying length of the leather touching the ram which can be held accountable, since this has been found to exert no appreciable influence, and as to the registering apparatus for the pressures, we are assured in both cases that it was carefully adjusted and tested, thus leaving no room for doubt on this score. As matters now stand, therefore, additional experiments are highly desirable—in fact, necessary, to set at rest the doubts and speculations as to what the friction of leathers and packing in hydraulic presses actually amounts to. The approximate figures which are all that is now available, are entirely too vague to serve any useful purpose, and should not be allowed to remain as the only data upon which engineers must base their calculations.

Railway Associations.

Some rather sensational articles and telegrams have lately appeared in the daily papers prophesying the early breaking up of the different traffic associations among our railroads. It is probable that the danger

among all their members, amount in each case to but little more than the salary of a capable officer, while the statistics alone, as well as the opportunities offered for exchange and discussion of views, are benefits worth indirectly all they cost. It is to be hoped that these associations will not be abandoned by the railroad managers, if for no other reason than because of the uniformity of action and comparative steadiness of rates, which they help to secure to the shipping public. It is a truth in political economy that even high taxation is not as bad as unequal taxation, and the same applies to transportation. When we consider how important a part of the value of our products and manufactures is the charge of the carriers, and how great the confusion in our industrial system would be if these charges showed wide fluctuations from day to day or week to week, we see how valuable is uniformity of tariffs. But such steadiness in the nature of things can only be secured by some sort of an agreement between roads which compete for the traffic between the same points. A cast-iron pool controlling absolutely the rates in a given territory is an extreme which the Interstate law condemns; but surely a haphazard style of tariff and rate making, where one road proceeds upon a theory entirely different from its rival, is the other and equally bad extreme. In our day, among the members of a given trade or manufacture, the necessity of some concert of action is recognized as never before in the history of commerce, and, leaving the so-called "trusts" out of view, there is still a large field for legitimate organization, for the collection of trade statistics, for the reformation of trade abuses and other worthy objects, which no healthy public sentiment will condemn. What, then, we demand for ourselves we should freely concede to our railroad friends, whose position as regards the need of such organization is even more difficult than our own.

We are still in the experimental stage as regards the pooling question. The strong roads favor its prohibition. They believe in the survival of the fittest because they believe that they are the fittest, but this does not cover the whole question. Chairman Blanchard's article upon the subject in the August *Forum* marks a distinct advance in the discussion of the problem. Mr. Blanchard advocates a restoration of the pooling privilege to the railroads, but under the minute and detailed oversight of the Interstate Commission. Possibly the author in writing the article had the precarious condition of the present associations in mind, and knowing the necessity of some organization, was preparing the public mind for a pooling plan under changed conditions. He asks: "If 50 cents is a reasonable rate, what objection can there be to its division among several competing lines?" None, of course, but that "if" involves the whole question. How shall we determine whether 50 cents is a reasonable rate? Only in one of two ways: Either by competition, as in mercantile affairs, or by some strong combination subject to the absolute right of some controlling body to alter rates at pleasure. The former is the principle of the Act prohibiting pooling, the latter is the plan proposed by the chairman of the Central Traffic Association. The latter plan involves also in time the close control of transportation by

Mark on ram.	Diameter of ram.	Area of ram.	Weight raised.	Pressure required per square inch, ram in ordinary working condition (good bearing).*	Loss, per cent.	Pressure required per square inch, ram in ordinary working condition (one-sided bearing).	Loss, per cent.	Pressure required per square inch after new cup-leather and being regreased (good bearing).*	Loss, per cent.	Remarks.
	in.	sq. in.	tons.	cwt.		cwt.		cwt.		
A	4 1-4	12.06	18 30	10 1/2 18 1/2	10.0 7.9	11 52	13.1 10.4	10 1/2 8 1/2	7.6 6.0	Cleaned, regreased, and cup leather renewed before being tested.
B	4	12.56	18 30	10 1/2 8 1/2	10.0 6.8	11 52	13.1 8.1	10 1/2 5 1/2	9.0 5.6	Tested before and after renewal of cup-leather.
C	3 1/4	8.29	2 4 5	600 1210 1500	9.9 10.6 9.9	830 1230 1530	14.2 12.1 11.7	..... ..... .....	..... ..... .....	Ram comparatively new. Packing in place of cup-leather.
D	8 7-16	55.91	10 30 60	4 11 1/2 28	10.6 7.7 6.7	4 23 1/2 23 1/2	10.6 10.1	4 11 1/2 23	10.6 7.7 6.7	Tested before and after renewal of cup-leathers. Those removed, however, were in good condition.
E	1 3/4	145.8	15 45 60	lb. 284 790 1000	18.8 9.0 7.7	lb. 300 790 1030	23.2 12.5 10.5	lb. 234 780 1000	18.8 9.0 7.7	Ditto. Ditto.
F	14 2-16	158.09	15 45 60	240 670 880	11.4 4.8 3.4	250 690 920	15.0 7.6 7.6	..... ..... .....	..... ..... .....	This ram is used for straightening purposes as a hydraulic bear; it is fixed in a horizontal position. It was formerly fitted with cup-leathers, but these seldom lasting more than one week, were replaced by packing, which has not been renewed for twelve months. The bear has been in constant use night and day.

* By "good bearing" it is meant that the weight raised was equally distributed over the upper surface of the ram.

The remarkable difference between these results and those of Mr. Hick needs not be specially pointed out. The discrepancy is so great that it attracts attention at once, the coefficients in several cases closely approaching Professor Rankine's, while in others they even go beyond. Mr. Tuit presents the figures simply as he obtained them, without comment or attempt to explain why they should point to such extraordinarily high percentages of friction; and, indeed, it is difficult to offer a satisfactory explanation

of any complete overthrow of these associations has been exaggerated, but there is enough truth in the report to cause anxiety in railroad circles. It is an open secret that great dissatisfaction exists with the large expense incurred for their support—an expense which certain members declare to be out of any proportion to the small amount of good the present form of combination is capable of doing. This, however, is not the opinion of other and more conservative railroad managers. The expenses of those organizations, as divided

some governmental machinery, and would also open such a body to the cry of "confiscation of private property" should they declare a reduction of rates in opposition to railroad managers—in fine, a step toward the bureaucratic system of Europe. Meanwhile, the plan of voluntary association is proving as incapable of producing all the desired results among railroads as it has among tradesmen. If we concede that some form of organization among carriers is essential to the best interests not only of railroads, but of the mercantile public, it remains still in doubt what the best form of that organization shall prove to be.

Our Trade with Hayti.

Like most other coffee-producing countries, our domestic export trade with Hayti has received a great impulse from the appreciation of the article, and as that country usually takes half of what it imports from the United States, it is to be hoped that the revolutionary change of government which occurred last month may not be followed by a disastrous renewal of civil strife. Revolutions have been more frequent in Hayti than in any Spanish-American country, hence the administration of President Salomon, lasting nine years as it did, and being in every respect successful, was an exception to the rule. A vigorous attempt to upset him was, it is true, made after he had been in power four years; civil warfare shook the Black Republic to its very foundations during many months in succession, but President Salomon put it down with an iron hand. The next attempt at revolution was early in June last; it was nipped in the bud by exiling the alleged ringleaders, Generals Manigat and Légitime.

Generally a Haytian revolution begins with a big incendiary fire at the capital, Port-au-Prince. Two such fires were kindled on July 4 and July 7, and an enormous amount of property became the prey of the flames, not a small portion belonging to foreigners. Two incendiaries caught in the act were shot, and for the moment all was quiet again, when early in August General Télémaque marched upon the capital at the head of an armed force, but was defeated at Plaisance by the Government troops under General Jumot on August 10. In spite of this check the revolution prevailed, and at Port-au-Prince General Boisrond-Canal tried twice, but in vain, to form a provisional Government. General Légitime was then called back from his exile in Jamaica, while President Salomon received an intimation to leave the country, which he did, boarding the British man-of-war *Canada*. He has gone to Paris, where he will stay permanently. Aged 75, as he is, and tired of politics, his career may be considered closed. During his nine years of rule President Salomon has achieved a great deal for the good of his country. He raised the credit of Hayti abroad, regulated and recognized the foreign loans, paid indemnities to all foreigners who had suffered from the rebellion in 1883, floated at Paris a new loan for 7,500,000 francs and settled with our Government the \$120,000 Van Bokkelen claim. President Salomon caused to be established more than 300 schools, built a palace for the Government and for both Houses of Congress, established a bank, opened sev-

eral roads and was just negotiating a contract for a railroad between Port-au-Prince and Cape Hayti, when he was compelled to leave. After the revolutionary troubles of 1883 President Salomon added to the navy two effective men-of-war, one a steel ram, under the command of Commodore Mason Cooper, formerly an officer in the United States navy. Hayti has now altogether five armed vessels, with a total armament of 30 guns, while the army has a strength of 6828 rank and file.

The outlays in 1886 were \$6,412,956, squared by an income equal in amount. The budget for 1887 fixed the outlay at \$4,066,236. Public indebtedness consists of a foreign debt of \$5,820,000, and a home debt of \$9,180,000. The circulating medium is the Haytian silver dollar, coined since 1881, of an intrinsic value of 80 cents American gold. Much has been done during President Salomon's rule, to improve the quality of Haytian coffee and prepare the same more intelligently for export; large establishments have been created for sorting and properly drying it, and during the nine years of his administration the export has from 40,000,000 pounds increased to 75,000,000 pounds.

There are two parties in Hayti—the negro and the mulatto party—the former being numerically the stronger, the latter representing the younger, more restless element. While Salomon understood how to rule them both, the personal ambition of the generals who now aspire to seize power may prepare troublesome times. In 1886 the import into Hayti amounted to \$4,965,256, while the export reached \$7,555,996. Our share in the import was 52 per cent., in the export 14; France's proportion was 21 and 66 respectively; England's, 15 and 5; Germany's, 9 and 8; Belgium's, 3 and 3, and that of other countries, 3 and 4. The goods exported in the same year were: Coffee, 58,075,733 pounds; cocoa, 3,939,445 pounds; wool, 2,037,653 pounds; hides, 436,579; orange peel, 461,768; sugar, 289,354; cotton seed, 34,536; tortoise shell, 906; wax, 3619; honey, 18,001 gallons; cigars, 17,000,000; logwood, 282,620,852 yards, and besides cotton, fustic, mahogany and old copper. The number of vessels entered was 684 with an aggregate tonnage of 668,003 at the four leading ports: Cape Hayti, Port-au-Prince, Gonaives and Aux Cayes, 427 thereof being steamers.

American trade during the last two calendar years was as follows:

	Import.	Domestic export.
1887.....	\$1,884,803	\$3,782,772
1886.....	2,309,989	2,702,114
Increase of export.....		1,080,658
		or 39 per cent.

A cablegram received at Washington on September 6 from Captain Chester, commanding the United States steamer *Galena*, arrived at Kingston, Jamaica, which was ordered to Port-au-Prince for the protection of American interests said to be imperilled by the recent revolution, stated that the troubles in Hayti were at an end for the present. It is to be hoped they may continue so.

A case of railroad discrimination recently ventilated in Kansas affords in itself strong justification for the creation of commissioners with power to correct abuses. It appears that the Missouri Pacific Railway Company handle a large tonnage of coal

from the mines of Osage County, Kan., and also from the mines in the vicinity of Rich Hill, Missouri. This coal they distribute among consumers scattered throughout a vast territory in Kansas. The coal operators of Osage County complained to the Kansas Railroad Commissioners that on July 20th the company raised the coal tariff from 10 to 30 per cent. higher than the old rates to all points which these operators could reach. It was charged that this was a willful discrimination against the Osage County operators in the interest of the Rich Hill mines, which are for the most part owned or controlled by the railroad company, and whose product is marketed in the same territory. Comparative tables were presented, by which it was shown that on a carriage of 109 miles the Osage County coal paid a freight rate of \$2 per ton, while the Rich Hill coal paid but \$1.10, which was a clear discrimination in favor of the latter of 90 cents per ton. Under such a tariff it was asserted that the Osage County operators would be obliged to discontinue business. After a thorough investigation, the railroad commissioners decided on the 13th inst. that the company had violated the laws of the State of Kansas, and that they should be directed to reduce the rates on Osage County coal to conform with those on the Rich Hill coal. Practices of this kind deprive the railroad companies of the sympathy which they desire to cultivate among the general public. They complain that they are unfairly treated by the railroad commissioners of several Western States, and that unremunerative rates are arbitrarily fixed by such commissioners, causing heavy reductions in earnings, making the payment of dividends to stockholders impossible, and seriously depreciating the value of railroad property. It is unfortunate for those who have their money invested in railroad stocks and bonds that the managers of their property should act in a manner calculated to excite the hostility of the general public toward railroad corporations. Until such managers learn to treat all interests fairly and honorably this friction will continue, and, in the meantime, owners of railroad stocks and bonds must suffer the unfortunate consequences of the folly of those who represent them.

The outcome of the proposals recently invited by the Secretary of the Navy for tubulous, sectional or coil boilers for one of the armored coast defense vessels will, no doubt, be closely watched, being of special interest because of the almost universally unfavorable experience with boilers of this class for shipboard duty. The Belleville boilers in the French Navy are, we believe, at the present time the only notable examples of such boilers afloat with which anything like satisfactory work has been done, and even so far as these are concerned it is still a fact that not a single ship of the commercial marine has been fitted up with them. In this country water-tube boilers have been tried for marine purposes in a number of instances, always with unsatisfactory results, though it may be said, with some reason, that their poor performance and early abandonment were more largely due to incorrect design and construction than to error in principle and general lack of efficiency. As a matter of fact, some of the early

boilers of this class placed aboard ship were condemned even before they were fired, and their failure on trial was to be expected. There were several reasons why they should fail. The tubes were connected rigidly and were placed nearly horizontally, no provisions being made either for expansion and contraction or for circulation. In the absence of equalizing pipes, moreover, connecting the steam ends of the several sections, the feed being supplied from a common water-pipe, some parts were liable to become empty while others were full of water. It is not strange, therefore, that the boilers did not last. They were repaired a number of times, and some changes were made, but they were finally condemned and replaced by others. Some which had been put in place were again taken out without ever having been fired. One of the ships in the United States Government service having a water-tube boiler built by Messrs. Babcock & Wilcox some years ago performed very satisfactorily—an exception, however, to what appears to have been a general rule. Added to the difficulties which resulted from the imperfect design of the boilers, were those of excessive weight and the great amount of space occupied by them, in themselves almost sufficient to cause their removal even had they been successful in other respects. Since the time of which we speak important advances, it is true, have been made in the building of water-tube boilers, but their special fitness for marine duty has by no means been yet established. In point of complexity, large size and heavy weight for given powers, they are still objectionable as compared with accepted types, though, on the other hand, they have redeeming features, such as safety, the possibility of longer life, efficiency and others which are not to be ignored. From whatever point considered, however, the tests which the Navy Department proposes to make with the boilers submitted for trial promise to yield data alike interesting and valuable. At the same time we doubt very much whether the results will be such as to warrant the adoption of any one of the designs for the purpose in question.

Steel Ties in Burmah.—According to *Indian Engineering*, steel ties, after having undergone a careful test for the past four years, on different parts of the line, are now displacing the teak railroad ties hitherto used on the open line of the State Railway. Teak so far has been found the best timber yet used for this purpose, and has been found to last as long as 10 years; but the use of steel ties economizes the expense of spikes, and is reported to last from 40 to 50 years. The low price now ruling has been a great inducement not only of substituting steel ties, but also a large quantity of steel rails is now being used in this Province.

Carter H. Fitz Hugh, formerly with Goulds & Austin, Chicago, has severed his connection with that firm to accept a position with Joseph T. Ryerson & Son, iron and steel merchants, of the same city. Mr. Fitz Hugh is well and favorably known in the Chicago iron and steel trade.

Mr. F. R. Phillips, 407 Walnut street, reports a large and continually increasing demand for Post's "Zero." Headquarters for "Zero metal" for Eastern Pennsylvania, New Jersey and Delaware is at 407 Walnut street, Philadelphia.

Copper Prices and Electrical Progress.

One of the principal claims in behalf of present high prices of copper put forward by those who have engineered the rise of the past year is that the consumption of the metal has become very much heavier by the introduction of electricity for a large variety of purposes. That the demand for copper wire for telegraph and telephone lines, for dynamos, motors, lightning and the transmission of power has very greatly increased cannot be doubted. Even the most careless observer of progress during the past few years must have been struck with that fact. But when the point is reached of securing some numerical expression of this new source of consumption—when the effort is made to ascertain, even roughly, how many pounds of the metal go annually into these new channels, then everything fails us. Figures could be reached only by an elaborate investigation freely and generally aided by those who draw copper wire. The quantity used in this country may be 20,000,000 pounds, and may possibly be considerably more, though it is not likely to be less. We have been unable to secure data from electrical companies which might throw some light on the rate at which this new business is developing so far as the quantity of metal used is concerned.

Some idea of the development in this country in a single year may be obtained from the figures submitted in President Duncan's address before the National Electric Light Association. In February last there were 4000 isolated electric lighting plants and central stations in the United States, which operated 175,000 arc lights and 1,750,080 incandescence lights. Since then there have been added 1361 new isolated plants and stations, operating 35,201 arc lights and 392,944 incandescence lights. A complete record is kept of these and shows that now there are 3351 plants and stations, operating every night 192,500 arc and 1,925,000 incandescence lights. There are also 459,495 horsepower of steam engines devoted to electric lighting. The capital invested in the electric lighting companies during the past half year has been increased to the extent of \$42,210,100. In February there were in this country 34 electric railways, with 138 miles of track, operating 223 motor cars, and utilizing 4180 horse-power for stationary engines. Forty-nine new roads are now being built, having a total of 189 miles of track, and to use 244 motor cars. There are also several motor factories, some of them employing as many as 1200 men.

Progressing with such leaps and bounds, it is not surprising that those who have undertaken to control the most important raw material entering in the construction of apparatus and lines should be sanguine concerning the aid which the new uses of electricity are liable to give them. Indirectly the call for copper from a new source with its promise of rapid increase is a subject of great interest to consumers of rolled and cast brass and copper in all its forms. In view of their requirements alone, the enormous production has already been stimulated by prices undoubtedly above any possible legitimate values. The question naturally arises, will the demand for electrical purposes increase so rapidly and so largely that it will enable the speculators to exact tribute not alone from every one who builds, operates, or uses a telephone, the electric light or plant for electric transmission of power or conveyance of goods or passengers, but also from every consumer of copper or brass? Has the high price of the metal already had the tendency to obstruct or to check the progress of electricity?

On the latter point we are in a position to place before the readers of *The Iron Age* the following letters from a number of companies who have had a prominent part in the development of the past few years.

A leading company in introducing electric railroads and motors write:

In our business the consumption of copper has quite largely increased in the last two years. We make a much larger number of motors, requiring a proportionately greater amount of copper wire, and we also use a large amount in overhead wires in street railway work—this part of the consumption being quite new. The average cost of the copper in any machine varies quite widely with the size of the wire used, and the effect of the recent rise in price of copper ingots varies in the same way, being small if the wire used is small, and being comparatively large if the wire used is large. The smaller wire requiring a considerable amount of labor to give it its market value, the price of the ingot has a relatively less effect. Roughly, we use 50 pounds of copper for every \$100 worth of work on our motors.

A concern manufacturing dynamos and interested in electric lighting and the distribution of power states:

The growth of electricity has considerably augmented the demand for copper, as it very largely enters into the cost and erection of a plant; and while we do not believe that the increased price has prevented the introduction of electricity, for the reason that the people are becoming educated to its use, and popular sentiment demands it, still the increased cost affects the manufacturers very materially, the competition in electric lighting apparatus being so active that prices cannot be made to compare with the increased cost of material, of which copper is a large element.

A producer of motors puts himself on record as follows:

We have no statistics of sufficient value for publication referring to the effect of the rise in copper upon the demand for our goods. We can briefly state, however, that we pay for copper for each machine nearly one-half the total cost of the machine. The business is yet so young that the motors have not established for themselves an accepted value, but their market price is largely governed by prices charged by some new company who are endeavoring to get the field. It will be some years yet, probably, before the market will be so settled that change in the price of the raw material will directly affect the selling price, and consequently the demand for the finished machine. The rise in copper has certainly added considerably to the cost of our plant and equipment.

A firm of large contractors holds the following opinion:

Inasmuch as a very large proportion of expense in electrical construction is for copper, the rise in price, which is the result of the operations of the syndicate, has, in our opinion, materially affected the introduction of electricity in plants of large size. We cannot answer your question as to what extent the cost of metal enters into the total cost of equipment, inasmuch as it depends so largely upon the character of the work. In some cases much the greater part of the cost is for labor, and in other cases a very large part of the cost is for copper.

From the Eastern States a concern making lamps and wires expresses the following opinion:

We have no doubt that the growth in the consumption of copper for electrical purposes has seriously influenced the demand and aided in making possible the success of the copper syndicate. Unquestionably the rise in copper has materially added to the cost of electric light plants. For instance, making estimates to-day for a local plant in a town of 15,000 inhabitants, our estimate for the wire for conductors is \$17,500. This estimate is 25 per cent. higher than it would be if copper were at the old price of 14½ cents. We do not believe the increase in the price has seriously affected adversely the introduction of electricity for light and power purposes. Our own business has increased threefold in the past year, and we doubt whether the increase would have been any larger had copper remained at the old price.

A very well-known company who are builders of electric lighting plants and of motors reply to our questions:

Two years ago we were not purchasing any copper, but during that time we have placed 3000 arc lamps and some incandescents. This,

of course, is a very small part of the business that has been done. The rise in copper has added materially to the cost of plant and equipment. The cost of copper is about 25 per cent. in our system as compared to the cost of other material and labor. In systems where they use many pounds of copper wire more to produce the same result the proportion would be greater. But if you consider the copper in line wire that it requires to install a plant the cost would be much more than the cost of labor and other material. We do not know that the increased price of copper has affected the introduction of electricity for a variety of purposes, but it has affected the pocket of the manufacturer.

An important Western company reports to us as follows:

With the constantly extending use of the electric light and electric transmission of power, it is obvious that the percentage of copper used in electricity has been and is increasing rapidly. We buy tons of copper now where we bought hundreds of pounds a few years ago, but it is noticeable that during all the time of this rapidly increasing consumption of copper the price of copper did not advance, but, on the contrary, fell to the lowest point it has seen. Since the recent large advance in price, it is our impression that the use of copper in electrical enterprises has diminished instead of increasing. The advance in the price of copper adds very materially to the cost of electric light and electric power plants. The cost of copper in a plant is perhaps one-third to one-half the entire cost of the plant, and the largely increased cost of an electric light or electric power equipment due to the advance in the price of copper has considerable influence in checking the introduction of plants.

The president of one of the great electric light companies writes:

The growth in the consumption of copper for electrical purposes has, in our judgment, seriously influenced the demand. We have been in business about 15 years and we use now about \$150,000 worth of copper in various forms each year, whereas 10 years ago our use of it was not even one-fifth as large. The rise in the price of copper has materially added to the cost of the electrical-apparatus manufacturing business. The cost of copper in our largest size machines, which are the ones we sell the most of, is a large part of the cost of the entire machine. We do not know that the increased price of copper has adversely affected the introduction of electricity, because, so far as we are aware, there has been no increase in the price of electrical apparatus to correspond with the increased cost of copper. We have always understood from the manufacturers of copper and brass materials that the electric light business was a very important element in their business, and that the amount of copper used in the aggregate in the entire electric light industry was very great indeed and constantly increasing. We believe there can be no question regarding this. Another point to be considered in this matter is the fact that the finest quality of copper is required for a very large part of this work and this grade of copper is apparently produced only by the Calumet and Hecla Mining Company, Calumet, Mich., and the other mines in that part of the country. We still believe, however, that the present price of copper is wholly artificial; that the facts regarding the increased demand, which we have admitted, do not justify any such increase in the price; that copper can be produced by existing mines in this country at a very large profit if it can be sold at 12 cents per pound, and we believe that if the matter should rest purely, as it should do, on the basis of supply and demand, the price would never go above 12 cents per pound.

An Eastern company handling electrical supplies says:

In our judgment the growth in consumption of copper for electrical purposes has to a great extent influenced the demand for that metal. Copper is one of the important factors in the construction of an electric light plant. The dullness of the past few months in the electrical field has been wholly due to the high price of copper. Now that the price has become fixed and there is no prospect for cheaper copper for some time to come business is going forward as usual, but not to that extent that it would with copper at lower prices.

The president of a prominent electrical company of New York writes:

I have not the time nor the information to properly answer your letter. Of course the advance in the price of copper affects to a certain extent the electrical business, not especially because of the quantity used in the construction of electrical apparatus, but principally as connected with the installation of the plant—that is, the wiring.

Washington News.

(From Our Regular Correspondent.)

WASHINGTON, D. C., September 18, 1888.

The Senate Sub-Committee on Finance are still at work giving hearings to industries, and are not disposed to cut them short. Senator Hiscock, when the subject of terminating this branch of their labors was broached a few days ago, said that he was opposed to any action in that direction; that he proposed to give every industry in the State he represented a chance to be heard wherever they had expressed such a desire. Senator Allison takes the same view, and in that he is sustained not only by his colleagues of the full committee but in the Senate.

It has been ascertained that the most important feature of the metal schedule of the Senate tariff bill will be the unification of iron and steel on the basis of uniform duties on imports for both revenue and protection. It is stated by members of the committee that the change in the system of regulating duties on manufactures in iron and steel will have the effect on a number of manufactures of steel of practically raising the duties. This is a very radical move on the part of the committee, but they claim that steel within the past 10 or 15 years has been substituted for iron in so many branches of metallurgical industry that they should be classified together. They claim that the revision might go further by making steel the basis upon which to regulate the duties on iron. This feature of the bill, when submitted to the Senate, will undoubtedly lead to a spirited and protracted debate, and will give the press generally, and technical papers in particular, a fruitful and fresh theme for comment and discussion.

The Democratic wing of the Senate Committee are in a bad way for some one to write their minority report on the Senate Tariff bill. Senator Voorhees, the senior on the committee, has given the subject no attention whatever, and does not desire to figure prominently just now in the heat of a campaign against the Senate Protective bill, nor to put himself on record quite so notoriously in favor of the Mills bill as an exponent of Democratic doctrine. Senator Beck is ill at Fortress Monroe and will not be able to resume his place in the Senate earlier than December, nor is he in condition to prepare the minority report, which was expected of him. Senator Harris, the other member of the Sub-Committee, is such an ultra pronounced free trader that a minority report by him would be an indorsement and an emphasizing of the Republican charge that the Mills bill is a free trade measure. How this question will be disposed of is a puzzling problem to the Democrats of the committee and the Senate.

Senator Allison says that, taking the experience of the committee as a guide, he has not found six prominent woolen manufacturers in the United States, and not over three in Rhode Island, the seat of that branch of textile manufacture, who are in favor of free wool.

The stockholders of the Redstone Coal, Oil and Coke Company held a meeting recently at the Monongahela House, Pittsburgh, at which the future plans and prospects of the company were discussed. Jacob E. Ridgway, of Philadelphia, president of the company, presided. Dr. W. R. Brown, also of Philadelphia, is the only other member of the company outside of Pittsburgh men. It was decided to proceed at once to develop their property in Fayette county. Their lands lie in Redstone township, several miles east of Brownsville, and the works will be located near Redstone Village. There are extensive

soft coal fields in the vicinity, but owing to lack of transportation the land has never been developed. Some time ago the Pittsburgh, Virginia and Charleston road surveyed a single track branch road from West Brownsville. On the line of the road the works will be located. Fifty coke ovens will be built at once. The plant will be increased as soon as the business warrants it. A coal shaft 265 feet will be sunk. The coal is right under the site of the coke ovens. The capacity of the latter will be about 2000 tons. A number of tenement houses will be built for the accommodation of the men sinking the shaft, and after the latter is completed the houses for the occupancy of the cokers will be put up.

We take the following from the Marquette, Mich., *Mining Journal*, of the 8th inst.: Shipments of iron ore from the mines of the Lake Superior region for the week covered by our shipping report aggregated 198,235 gross tons, to which total this port contributed 52,957 tons, Escanaba, 70,499 tons; St. Ignace, 326 tons; Ashland, Wis., 53,315 tons, and Two Harbors, Minn., 11,038 tons. The total for the season is 2,806,173 tons, this being 214,783 tons less than the quantity that had been sent to market by water at the corresponding date last year. The shipments by ranges to date are as follows: Marquette range, 1,113,139 tons; Gogebic range, 810,055 tons; Menominee range, 661,662 tons; Vermillion range, 221,353 tons. The following table shows the shipments by port up to date this season in comparison with the shipments for the corresponding portions of the two preceding years:

Port.	1888.	1887.	1886.
Marquette.....	508,437	557,909	615,022
Escanaba.....	1,312,709	1,383,419	1,006,890
St. Ignace.....	70,526	63,467	45,527
Ashland, Wis.....	689,148	759,850	465,508
Two Harbors, Minn.....	221,353	256,911	211,954
Total.....	2,806,173	3,020,956	2,344,907

Railroad growth in the United States, as shown by the examination of statistics, corresponds very nearly to the actual demands of business. Comparing the census of 1880 with the latest report of railway operations it appears that the tons of freight transported 1 mile during the census year numbered 32,848 millions, and last year 60,061 millions, according to Mr. Poor. A little division brings to light the fact that the average was about 868,000 tons 1 mile for every mile of railroad in 1880, but it was 438,000 tons 1 mile for every mile of railway in 1887. The increase of 70,000 tons per mile of road operated is not quite 20 per cent., but, in spite of the increase in mileage, which has been extraordinary, the increase in tonnage transported has been nearly a fifth greater. It becomes evident that there is now more business for every mile of road in operation than there was eight years ago, although the mileage, meanwhile, has increased more than half. On the old roads traffic increases faster than population.

Three cruisers for the Spanish navy are to be built in Spain, by a native firm, who intend, with the assistance of a North of England shipbuilding company, to establish works in that country.

German steamers are getting a strong position in the coastwise trade of Japan, in this respect placing those of England at a disadvantage. While British tonnage doubled at some of the leading ports since the year 1880, that of Germany increased many fold. It is surmised that a grand opening exists for the introduction of American steamers of from 600 to 1500 tons carrying capacity and not under 9 knots per hour.

THE WEEK.

A large gang of men at work in the Hoosac Tunnel were overcome by coal gas from a passing locomotive, owing to a condition of the atmosphere peculiarly unfavorable to free ventilation, and 18 were rescued in an unconscious state. Two of them will probably die.

Five employees of a leading grocery firm in this city, shipping clerk, carmen and others, who entered into a conspiracy to rob the firm, were sentenced by the recorder to five years in the State prison.

The new machinery of the steamer City of New York is not easily persuaded to come up to the requirements for high speed. The delay experienced by her on the first trip out from Liverpool was scarcely less aggravating on her second trip just completed. Some of the valves of the main circulating pumps caused a delay off Queenstown, and later the same difficulty occurred again, causing both the port and starboard engines to slow down or stop altogether, and, finally, when the ship was off Newfoundland, the valves gave out, causing some anxiety, if not alarm. The climax was not reached, however, until the engines remained stationary for two hours, on account of trouble with one of the piston-rods. The entire voyage occupied eight days and 13 hours.

Wire gauze for baled cotton is recommended as a covering equal to jute bagging, having withstood the severest tests when exposed to fire, and the subject is being favorably considered at the New York Cotton Exchange.

Dismal accounts come from South Carolina and Georgia respecting the destruction of cotton, corn and rice by the recent floods.

An interesting conflict took place at Sydney, New South Wales, about August 1, between the local labor organizations and the Oceanic Steamship Company, assisted by the United States Consul Griffin. The former demanded that Captain Morse of the California steamship Mariposa should receive on board some 20 odd Australians to take the place of an equal number of Mongolians employed in the fire and engine-room of that steamer. In defiance of fierce opposition the consignees of the cargo succeeded, with the aid of the police, in discharging the vessel—an object that was important, in consideration of the fact that the merchandise on board consisted mainly of contributions for the Melbourne Centennial Exhibition. It had been widely affirmed that, although the Mariposa might land her cargo, she would be prevented from going to sea by lack of coal. Not only had the coal heavers refused to work upon the vessel, but all the coal-dealing firms in the city had been warned not to furnish her with fuel. Great surprise therefore was occasioned when 1500 tons of coal were floated alongside under protection of the Sydney police, the American Consul having in due season made ample provision for the precise emergency which arose.

The provisional government organized in Hayti, under ex-President General Boisrond Canal, is said to have the entire confidence both of native and foreign merchants. Business is brisk and the premium on gold has fallen to 20 per cent.

The East India cotton crop this season falls below the very short crop of last year.

The Julien electric car has made another successful run in this city and the company are eager to put it on the roads, but thus far the Aldermen withhold their sanction. The car rests upon double rails similar to those used on steam railways.

The wheels of each truck, however, are set very closely together, the distance from center to center being only 3 feet, as compared with 4½ feet to 6 feet on the ordinary railway trucks. The entire truck, moreover, is pivoted not at the center but at the end. These two modifications enable the car to make very short curves and secure ease and smoothness of motion. The same motor that propels the car furnishes the light that supersedes the oil lamps in the car. Each truck carries a motor capable of propelling four cars, so that the danger from break down is reduced to a minimum. A fresh battery stores sufficient power to drive a car with ordinary load for 30 to 35 miles.

The export trade in cotton at New York is being diverted to Norfolk by the prevailing high ocean rates from this port, in conjunction with the lack of "compress machinery" to reduce the size of the bales, but a large machine will soon be in operation in this market, supplying much needed facilities.

The shipyards on the Delaware are expecting a number of new contracts, and are providing themselves with heavy tools. Claus Spreckels wants steamships of the largest size for the Australian line. Two steel steamships are about to be put under contract for the Ocean Steamship Company, of Savannah, for the coastwise trade. A steamer to carry oil in bulk is wanted by the Standard Oil Company, and Boulton, Bliss & Dallett, whose steamship line to Venezuela has proved so successful, want two more vessels to replace two recently sold for service on the Pacific. Work enough is in prospect to keep all the yards busy for the next two years.

Japan, like China, is giving earnest attention to the manufacture of cotton. Already there are 21 mills in Japan, the number having been doubled within the last 18 months, and it seems not unlikely that the Japanese will soon be independent of all other countries as regards cotton yarns. In China cotton yarns form about 30 per cent. of the value of all cotton goods imported, and the demand is continually increasing. Much yarn is imported from Bombay.

The Grand Opera House block, in Syracuse, was burned, 13th inst., and the loss is computed at \$208,000. Among the occupants were John Hamon, Jr., stoves and hardware, loss \$6000, and George S. Friend, stoves and household hardware, whose loss is estimated at \$8000.

The contract for the erection of the main exposition building, in Pittsburgh, was awarded to Murphy & Hamilton for \$155,303. The contract embraces every detail necessary to a complete fire-proof building. The work is to be commenced not later than October 1 and is to be finished in seven months from that date.

China now has an effective navy, comprising four armored ships and eight unarmored, all built in Germany within the past five years, also four cruisers, including two in course of construction in the extensive dock yards at Foo Chow and near Shanghai. All the new vessels are fitted with the most approved appliances known to modern warfare, fully abreast of the times.

A correspondent in Bombay, alluding to the production of Indian cotton goods, says that the competition is becoming more keen every year, since, owing to the cheapness of labor in India, the manufacturers in that country can produce and sell their goods at the lowest possible price. An idea of the rapid growth of this industry in India is afforded by the fact that in 1865 there were only 18 spinning mills in the Presidency of Bombay, whereas at the present moment there are 70, and the num-

ber of spindles increased during the period in question from about 285,000 to nearly 1,750,000. The number of looms now at work may be reckoned at nearly 15,000, against 3579 in 1865. The annual consumption of raw cotton now amounts to about 486,000 bales. In all India there are at present 95 cotton-spinning mills and weaving establishments, containing 2,250,000 spindles, 17,500 looms, and affording employment to nearly 75,000 hands.

The new treasury vault at Washington is a great subterranean apartment about 60 x 40 feet square and 15 feet high, and, when filled with silver dollars about six months hence, will contain \$100,000,000 of treasure. The old vault adjoining is brim full and contains \$90,000,000, mostly in silver. The Queen of Sheba would be more than astonished if she could view the spectacle.

The electric lights on the Brooklyn Bridge, like that removed not long ago from Hell Gate, are the subject of complaint by navigators who object to their dazzling effect. The Light House Board claim to have jurisdiction in the matter and propose to shade the lights, thereby removing objections, but the Bridge Company do not recognize the authority of the board, so that it remains for the United States Attorney-General to take such action as may be deemed necessary.

India will not very soon displace China in the tea trade. The annual report of the Imperial Maritime Customs, of China, for the year 1887, shows that the competition of its Indian rival has really had but little, if any, effect upon its tea trade, for there has been only an insignificant falling off in the total exports for the year. The total exports for the calendar year amounted to 2,096,097 piculs, against 2,217,295 piculs in 1886, a falling off of only 120,000 piculs or about 5 per cent. A much greater difference is shown in a comparison of values for the two years, the exports in 1886 being valued at 33,504,820 taels, while last year they amounted to only 29,379,838 taels, which is due, of course, to the comparatively low prices that prevailed last year. In the light of these figures there seems to be very little cause for apprehension that the tea trade is to be seriously disturbed, since Great Britain is almost the only market for the India product.

An event in Congress was the action of the House in passing the Senate bill amendatory of the Interstate Commerce law. As the bill came from the Senate, it carried out several of the recommendations of the Interstate Commerce Commission in the way of strengthening and simplifying the law. The bill, as it passed the House, carries a number of important amendments conferring concurrent jurisdiction upon United States and State courts as to complaints under it and requiring the Interstate Commerce Commission to prescribe for common carriers one uniform rate of classification, which shall be transmitted to the common carriers before the first Monday in July, 1889, and any violation of this classification shall be deemed unreasonable rates. The Commission is required to execute all the provisions of the law, and, upon its request, the Attorney-General of the United States shall institute and prosecute all necessary proceedings in the proper court for its enforcement. The final amendment makes it unlawful for any common carrier subject to the provisions of this act to carry refined oils and other petroleum products, cotton-seed oil and turpentine for any shipper in tank or cylinder cars, who shall own, lease or control the same in any manner, except upon the condition that said carrier shall charge the same rate for the transportation of said products in wooden packages or barrels, in carload lots, as in said tank or cylinder cars, the said tank and cylinder and said wooden

packages and barrels being carried free in each case. Senator Cullom, who carried the bill through the Senate, said he thought some of the amendments would endanger the passage of the bill at this session if insisted on. He will move, when the bill reaches the Senate, to nonconcur in the amendments and ask a committee of conference. He believes that the matter can be put in such a shape in conference as to meet the approval of both houses.

A steel steamer to carry about 3500 tons of iron ore has been contracted for in England, to ply between Philadelphia and St. Jago de Cuba, in the Earn steamship line. She will be called the Earnfoard, and have triple-expansion engines.

A Pittsburgh firm have received an order from Mexico for 25,000 fire-brick, to be used in the construction of a charcoal blast furnace in Durango. The cost of delivering the brick will be \$250 per 1000. As the railroads do not extend nearer than 100 miles of the place where the furnace is to be built, it will be necessary to transport the brick that distance in wagons and on jackmules.

It is reported from Ottawa that the retaliation proposal has caused the successful floating of an \$8,000,000 scheme, which includes the purchase of the North Shore Line from Quebec to Ottawa and the extension of the Pacific Railway from there to Sault Ste. Marie, thus giving direct railway connection between Lake Superior and the seaboard.

Cutlers' Hall, in Sheffield, England, has been nearly doubled in capacity this year, with an improved banqueting-room, extensive lavatory, drawing-room, &c.

The Treasury Department have decided that nail files, and nail cleaners with metal files, are dutiable at the rate of 45 per cent. ad valorem as manufactures of metal and bone; also, that articles commercially known as botton shanks (being small brass cups into which the molds are set in the manufacture of buttons) are dutiable at the rate of 45 per cent. ad valorem as manufactures of brass; also, that goods known as "wool back worsted coatings," composed of wool and worsted, are dutiable at the rate of 35 cents per pound and 40 per cent. ad valorem as manufactures of wool.

The recent cyclone in Cuba proves to have been frightfully destructive. Aside from the destruction at Cardenas, Havana, and other seaports, the tobacco crop suffered severely, and throughout the island over 3000 buildings of various kinds were prostrated. The aggregate loss is estimated at \$10,000,000, and over 800 persons were killed. The loss of life in Sagua alone is about 400.

An exposition is to be held at Berlin, Prussia, from April to June, 1889, of machinery, apparatus of all kinds now in use to guard against accidents, tools, working materials in models; of plans, drawings, photographs and specifications; of copies of regulations, rules for factories, and printed matter relating to accidents and their prevention. All articles that relate generally to the protection of laborers and to the promotion of their welfare and safety while at work will be accepted, and the invitation to participate is extended to all nations. Consul-General Raine in a report to the State Department, dated May 4, 1888, furnishes a copy of the regulations to govern the exhibition, from which it appears that devices for ventilation of workshops and many other things which at first sight were hardly considered as belonging to an exhibition for the prevention of accidents are included. Applications made after July 1, 1888, long since passed, it is stated, will be considered only if any vacant space remains.

MANUFACTURING

Iron and Steel.

Rebecca Furnace, of the Kittanning Iron Company, Limited, at Kittanning, Pa., which has been idle for some months, was blown in last week, with good prospects for a steady run.

Fanny Furnace, operated by J. C. Hamilton, Shawnee, Ohio, trustee, will resume operations in a few weeks. A new bosh has been put in, general repairs have been made, and a new brick casting house, 37 x 85 feet, is being put up to replace the old one, recently destroyed by a wind storm.

W. B. Pollock & Co., of Youngstown, Ohio, manufacturers of boilers and all kinds of rolling-mill and blast-furnace work, have been awarded the contract for all the ironwork entering into the construction of the hot-blast stoves to be erected at the Tod Furnace of the Brier Hill Iron and Coal Company, at Youngstown, Ohio. The contract is quite a large one and will keep the firm busy for some time to come.

After a long idleness the plant of the Etna Iron Works, Limited, at New Castle, Pa., was started up in full in all departments except the rail mill on Monday, the 10th inst. The works are being operated by A. W. Thompson, who has a lease of the same.

D. W. C. Carroll & Co., of Pittsburgh, on the 14th inst. closed a contract for the erection of two iron viaducts for the city of Denver, Col., to cross the railroads, which all center in one part of that city. One viaduct is to be 376 feet long and 32 feet high, and the other 785 feet long and 32 feet high. The viaducts are to be made of structural iron, including the approaches. They will be of sufficient width to allow of a driveway and two footpaths. The viaduct cost \$97,000 and the approaches \$21,000 additional.

Bids for building the superstructure of the Seneca street bridge, Cleveland, were opened in the office of the Board of Improvements last week. There were five proposals, two of the bids being informal. The bidders were required to furnish figures for the 215 tons of iron and 35,000 feet of lumber required. The Pittsburgh companies did not furnish any sureties and, although their bids were recorded they were not considered. The bid of the Variety Iron Works was the lowest, the price for the iron being \$74.50 per ton and for lumber \$30 per 1000 feet. The King Iron Bridge and Manufacturing Company offered to furnish the iron for \$96 per ton and the lumber for \$28 50. The Detroit Bridge and Iron Works bid \$105 per ton for the iron and \$33 per 1000 feet for the lumber. The totals are as follows:

Variety Iron Works.....	\$17,067.50
King Iron Bridge and Mfg. Company..	21,607.50
Detroit Bridge and Iron Works.....	23,730.00
*Pittsburgh Bridge Company.....	26,790.00
*Shiffer Bridge Works, Pittsburgh.....	27,052.50
*Informal.	

The contract for the substructure has already been let at \$46,000, and the engine house yet to be built will cost \$5000, making the total cost of the structure about \$70,000.—Cleveland, Ohio, Trade Review.

The Wayne Iron and Steel Works, of Brown & Co., at Pittsburgh, have been closed down for the past two weeks, on account of a strike of the workmen. Recently two pieces of steel were spoiled and the firm demanded that in the future the heater shall be held responsible for such losses. To this the men would not agree and a shut-down was the result. It is expected that the matter will be amicably arranged during the present week and operations resumed again.

The new plant of the Allegheny Bessemer Steel Company, at Duquesne, Pa., about 25 miles from Pittsburgh, is rapidly nearing completion, and is expected to be ready for operations by January 1. The Bessemer department is already finished and filled with the most improved modern machinery. In the rail mill hydraulic working machinery will in nearly every instance take the place of roll-hands, furnacemen, shearsmen, and hot-bed men.

Norway Furnace, at Bechtelsville, Pa., operated under lease by Gabel, Jones & Gabel, of Pottstown, Pa., is at present undergoing extensive repairs. It will resume blast about November 1, next.

The Advance, of Latrobe, Pa., says concerning the steel plant to be erected there: "After a large amount of preliminary labor, such as drafting, corresponding, and making preliminary arrangements, P. J. Dalton has secured the contract for the foundation work of several large buildings and will put his men to work at an early day. Bids for the ironwork of the buildings are in from a number of firms, as are also bids for the construction of the greater part of the machinery. When work is once commenced the buildings will be put up rapidly."

The plans of the building to be erected at Washington, Pa., by the Novelty Steel Wheel Company, of Pittsburgh, have been finished, and the contract for the building will be let during the present week. As was stated in *The Iron Age* of last week, the company will manufacture steel wheels exclusively for wagons, buggies, &c. About 200 hands will be given employment by the new firm, and the works are expected to be ready for occupancy by January 1, next.

The Henderson Steel and Mfg. Company, of Birmingham, Ala., have increased the capacity of their 14-ton experimental open-hearth furnace to 3½ tons. The first melt in the enlarged furnace was successfully made on the 22d of August.

It is understood that if the Laclede Plate and Sheet Mill Company secure another lease on the Laclede Rolling Mills they will order improvements of the value of \$20,000 or \$25,000, to better adapt the mill to the requirements of the rolled iron trade of the West, and of this locality more especially. It is undecided as yet, however, which of the three interests offering to take the property under a lease will secure it, though the matter is expected to be settled in a week or two. But it is quite safe to say that, in any event, the mills will be operated this winter.—*Age of Steel, St. Louis.*

No. 5 furnace of the Thomas Iron Company, at Hokendauqua, Pa., is undergoing extensive repairs and will be ready soon for blast again.

The employees of the American Iron Works of Jones & Laughlins, Limited, at Pittsburgh, have organized a beneficial association. None but those employed in the machine shop, polishing mill, foundry, chain factory, bolt factory and pattern shops and roll turners are eligible to membership in the new organization, which will pay to a sick or disabled member incapacitated for work \$5 per week, and, in case of the death of a member, \$100 to pay funeral expenses. The association have an initial membership of 150.

James P. Witherow, engineer and contractor, of Pittsburgh, whose works are located at New Castle, Pa., has received the contract for the erection of the buildings for the plant of the Latrobe Steel Company, at Latrobe, Pa. The buildings will be made of wrought iron and will be fire-proof. The dimensions of the open-hearth steel department will be 250 x 80

feet. Connecting with it will be an L the same length and 40-foot span. The hammer shops will be 350 feet long, with an 80-foot span, and will have an L the same length and 40-foot span. The company will manufacture tires for all kinds of wheels. About 300 men will be given employment. The projectors of the enterprise are Eastern capitalists.

Some time ago P. L. Kimberly & Co., Limited, proprietors of the Atlantic Iron Works, at Greenville, Pa., made a proposition to their workmen to work six weeks and then receive two weeks' pay, and pay every two weeks thereafter. This proposition has been accepted and the plant, which has been idle for some months, has resumed operations in nearly all departments. The principal product is cotton ties, about 60 tons per day being the present output. The works contain 26 puddling furnaces, 4 heating furnaces and 1 8-inch and 1 10-inch train of rolls.

The Rogers Foundry Company, Belleville, Ill., have been awarded an increase of contract for cable yokes for a Denver street railway. This line of work has become a leading specialty with them, and they are now getting ready to increase their output of yokes from 125 a day, as at present, to 150.

The Bouton Foundry Company have sold their extensive architectural iron works, on Archer avenue, Chicago, to a railroad company, whose line will pass over the site. Under the conditions of the sale the Bouton Foundry Company are given a year in which to select a location elsewhere, so that they will suffer no interruption to their business by reason of the enforced removal. They are now considering the relative advantages presented by several choice locations, but have not yet determined which of them will be selected.

G. A. Millard, of Indianapolis, Ind., has opened an office at 14 Vance Block, for the sale of pig iron and coke, copper, tin, antimony, old wheels, old rails, steel rails, blooms, billets, slabs and wire rods.

Machinery.

The largest cotton press ever built at the works of the Scott Foundry and Machine Company, Limited, at Reading, Pa., was shipped to Brunswick, Ga., last week. The press weighs 230 tons, standing on a base 12 x 24 feet, connecting with four links 38 feet long and each weighing 9 tons. One of the castings of the press weighs 25 tons.

The Bethlehem Steam Heating Company, of Bethlehem, Pa., is the name of an intended corporation, which has applied to the governor for a charter.

The Southern Pacific Railroad Company have purchased a combined arc and incandescent plant, consisting of eight double lamps, twenty-four 25 C. P., and ten 100 C. P. lamps to light their station and surroundings at Los Angeles, Cal., using the Waterhouse system controlled by the Waterhouse Electric and Mfg. Company, of Hartford, Conn.

The works of the Russell Mfg. Company, brass founders and machinists, of McKeesport, Pa., which have been idle for some time past, resumed operations on Monday the 17th inst. S. M. Highlands, who has been with the American Water Works Company for a number of years, has been secured as general manager, and it is expected that the works will continue in operation, as the firm have a number of large orders on hand.

Among their late sales the Ball Electric Light Company, of New York City, report the following: 100 arc lights and 200 incandescents, through their Mexican agents, I. Aguirre & Bros., for Toluca,

Mexico. 35 arc lights (increase) to the National Worsted Mills, Providence, R. I. 70 arc lights to W. A. Walton & Co., Wood River Junction, R. I. Hartford Electric Light Company, Hartford, Conn., 200 arc lights (increase). Jersey City Electric Light Company, Jersey City, N. J., 50 arc lights (increase). Novelty Electric Company, Philadelphia, Pa., 25 arc lights. Clarksburg Electric Light Company, Clarksburg, W. Va., 70 arc lights. Pennock Bros., Minerva, Ohio, 25 arc lights. J. L. Bueron, Quezaltenango, Central America, 210 arc lights, and 350 incandescents. Muncie Electric Light and Power Company, Muncie, Ind., 25 arc lights. Consolidated Coal and Iron Company, Wellston, Ohio, 26 arc lights. Ball Electric Light Company, of Cincinnati, Ohio, 30 arc lights (increase). Manton Mills, Manton, R. I., 70 arc lights (increase).

The new works of the Cleveland Twist Drill company at Cleveland, Ohio, are rapidly approaching completion, and will probably be occupied by the firm early in November next. The main building is 100 x 40 feet, with tempering and forge shops adjoining. New machinery will be added to keep up with the increase in business.

The Westinghouse Electric Company, of Pittsburgh, are at present at work on a plant for a town on the Pacific coast near San Francisco. There will be 1300 lights put up as soon as possible, together with the necessary engines, dynamos, &c., and the plant will be in operation in the course of a couple of months.

The Pittsburgh, Fort Wayne and Chicago Railroad Company have recently added to their equipment four engines, which weigh 65 tons each. These engines are calculated to make the run between Alliance and Crestline, over 100 miles, without stopping for coal or water.

The Kimble Steam Engine Company have been organized at Kalamazoo, Mich. It has an authorized capital of \$100,000, of which \$75,000 have been paid in. It will give employment to several hundred men.

The Canton Car Company, of Canton, Ohio, will change their name shortly to the J. H. McLain Machine Company.

Eynon & Marshall, engines builders and machinists, of Cleveland, Ohio, are receiving numerous orders for their slab-milling machine. On account of an increase of orders the company have been compelled to erect a new factory, which they expect to occupy in November next.

The Western Mfg. Company, of Lincoln, Neb., have recently been incorporated under the laws of the State of Nebraska, and the following officers have been elected to take charge of its affairs from and after this date: J. F. Barnard, president; H. J. Walsh, vice-president; M. D. Welch, secretary and treasurer; W. W. Marsh, superintendent of shops. Mr. E. Hurlbut, Jr., the former manager, retired from the company on the 1st inst. The company manufacture farm machinery. They write us also that they have recently added a cooperage department to their works, and have now a capacity of 500 barrels or tierces per day, and are prepared to fill all orders for above goods.

Hardware.

It is stated that Col. S. F. Scott and C. P. Deatherage have purchased a two-thirds interest in the machinery of the Harrison Wire Works, St. Louis, the other third being held by James C. Anderson, Chicago. It is also announced that the machinery will be moved to Kansas City, Mr. Anderson managing the concern.

The Ludlow-Saylor Wire Company, St. Louis, Mo., have added to their plant facilities for doing electro-bronze plating. They have just completed some elegant work for the new Mercantile Library building in the way of artistic brass elevator inclosures and iron grilles for library room. They have also recently furnished the American Central Insurance building with brass elevator inclosures and electro-bronze work in their office, besides some other large jobs for banks and buildings throughout the West and South.

The Iowa Farming Tool Co., Fort Madison, Iowa, are putting in a plant for the use of crude oil as a fuel, instead of anthracite coal. The expense attending this departure is considerable, but it is anticipated that it will give better results, and diminish the cost of producing the goods.

L. B. Heller & Co., Montreal, announce that they have commenced the manufacture of Horse Raps and Files having the brand "L. B. Heller," the work being under the personal supervision of L. B. Heller, who was formerly connected with Heller & Bros., Newark, N. J., the two houses being, however, entirely distinct.

The Celina Tack and Nail Company have been incorporated at Celina, Ohio, with a capital stock of \$20,000. B. S. Taylor and others are the incorporators.

Miscellaneous.

The Reading Coal and Iron Company are considering the advisability of sinking a shaft midway between the Potts and Keystone collieries, near Ashland, Pa. It is claimed that the vein which would be tapped is 35 feet in thickness, and would not be exhausted for half a century. Recently the company extended its operations in the East Franklin colliery, which had been abandoned as of little value, and struck a heavy vein of hard anthracite of excellent quality. As soon as the breaker and shaft shall have been put in good condition mining operations will be commenced.

The Star Fire-Brick Company, of Pittsburgh, have just closed a contract for 25,000 fire brick, to be delivered at Durango, Mexico. They will be used in the construction of a charcoal blast furnace to be built by the Mexican Iron Mountain Mfg. Company. The cost of delivering these brick will be about \$250 a thousand. As the railroads do not extend nearer than 100 miles of the place where the furnace is to be built, it will be necessary to transport the brick that distance in wagons and on jack mules. This firm are also filling an order for 250,000 brick for the Isabella Furnace Company. They will be used in rebuilding furnace No. 2, which is now in blast, but will be blown out some time this fall. The same firm have an order for 300,000 brick, which will be used in relining Lucy Furnace No. 2.

Edw. D. Bolton, of the firm of T. William Harris & Company, 44 Broadway, New York, has been appointed consulting engineer for Asheville, N. C., in connection with their sewerage system, upon which it is proposed to expend \$100,000. John G. Aston, the city engineer, will be the resident engineer.

The Common Sense Stove Polish Company have succeeded Gana & Martin, manufacturers of stove polish and shoe blacking, 270 West Randolph street, Chicago. They are distributing to purchasers of their common sense stove polish copies of Munkacsy's celebrated painting, "Christ before Pilate." It is a photo-gravure, 11 x 14 inches in size, and said to be the best copy of this famous work now in the market. A copy of the picture double this size, 22 x 28 inches, is given to each dealer for his personal use.

TRADE REPORT.

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St., PHILADELPHIA, Pa., September 18, 1888.

Pig Iron.—The market has shown a hardening tendency during the week, and in the majority of cases buyers would have to pay a little more money for desirable brands. There is no quotable change in the general market, but inside prices, such as \$16 for Gray Forge, \$17 for No. 2, and \$18 for No. 1, are now very exceptional, and are hardly taken into consideration by those who control good Irons. But consumers make no great effort to place orders, as they are generally pretty well provided for, and are more inclined to await developments than to pay advances on material which may not be required for two or three months to come. Sellers, for the same reason, have plenty of orders on their books, and if belated buyers must have Iron they have no alternative but to pay the advance, averaging, perhaps, 50¢ per ton from the lowest. Consumption is large, and the general position is very satisfactory, but it is hardly likely that prices will be marked up again, for the present at all events. Production is increasing, the change as shown by last week's *Iron Age* being at the rate of 6000 tons per week increase, comparing September 1 with August 1. Then there are intimations of a further increase in the South at an early date, so that it is not merely a question of absorbing the present output, but several thousand tons per week on the top of that. If prices remain as they are the increased supply may not be as much, but a dollar a ton on the price means a great deal more Iron for sale, but there is no reason to suppose that it will make consumption any the greater. For these and other reasons the trade are by no means inclined to pay fancy prices. They will take liberal quantities at the old figures, but only such small lots as they must have at the higher prices. Meanwhile sales are being made on the basis of \$16 @ \$16.50 at tide for Gray Forge, \$17.50 @ \$18 for No. 2, and \$18.50 @ \$19 for No. 1. In exceptional cases a few orders may have been taken at \$16, \$17 and \$18, but they would not be fair quotations in the present condition of the market, which, as already stated, is unusually strong without being feverish or excited.

Foreign Iron.—Prices are purely nominal, as consumers can do much better on domestic Irons. Sellers quote \$20 @ \$20.50, c.i.f., duty paid, for Bessemer and \$26 @ \$26.50 for 20 % Spiegel, but there are no bidders at anything near these figures.

Blooms.—A good demand is reported, and prices are firm at about the following quotations: Nail Slabs, \$20 @ \$29.50; Billets from \$30 to \$35, f.o.b. cars at mill, according to analysis; Charcoal Blooms, \$52 @ \$54; Run-out Anthracite \$42 @ \$44; Scrap Blooms, \$33 @ \$35 per "bloom" ton of 2464 lb. Foreign at tide, c.i.f., duty paid, \$29.50 @ \$30.50 for Nail Slabs; \$32.50 @ \$34 for 4 x 4 Billets, and \$35 @ \$39 for Siemens-Martin, price according to analysis, &c.

Muck Bars.—Prices are very firm at about \$29 @ \$29.50, delivered, with quite a large business at figures equivalent to \$29, Philadelphia. There is still a good deal of inquiry and bids at about \$28.75 for large lots, but holders are not inclined to make concessions.

Bar Iron.—The mills have taken in a good many orders of late, and are so comfortably situated that they are very firm in quoting on new business. Probably

1.85¢ might be accepted for good-sized orders, but some of the leading mills quote 1.9¢ @ 1.95¢ firm and there is no doubt that the tendency is steadily in sellers' favor. Inquiries are in the market from car-builders, and it is thought that some important additions to the work on hand will be made before the end of the month. Skelp orders are also on the market, with sales at 1.85¢, although 1.87½¢ @ 1.9¢ is asked for early deliveries. Taking the market as a whole, the position is decidedly favorable to sellers, and, while no important changes in prices are expected, there seems to be plenty of business and firm prices, varying, as we have said, from 1.85¢ to 1.9¢ for strictly good iron.

Plate and Tank Iron.—A good business is reported at all the mills in this vicinity. Prices are firm, but not higher, although a little more pressure in the demand would soon lead in that direction. The mills seem to have plenty of work up to November and the indications are very promising for a good demand during the latter portion of the year. Prices are firm as last quoted: Ordinary Plate and Tank Iron, 2.05¢ @ 2.15¢; Shell, 2.4¢ @ 2.5¢; Flange, 3.5¢; Fire-Box, 4¢; Steel Plates, Tank and Ship Plate, 2.3¢ @ 2.4¢; Shell, 2.7¢; Flange, 3¢ @ 3½¢; Fire-Box, 3½¢ @ 4½¢.

Structural Iron.—No large orders are offering at the moment, but the mills are kept fairly busy on old contracts, and with such small lots as are called for from day to day. There is nothing in the outlook calling for special remarks, business being rather quiet, but manufacturers appear to feel hopeful of renewed activity in the near future. Prices are steady as last quoted—viz.: 2.10¢ @ 2.15¢ for Bridge Plate; 2¢ @ 2.10¢ for Angles; 2.6¢ @ 2.7¢ for Tees, and 3.3¢ for Beams and Channels, Iron or Steel.

Sheet Iron.—The demand is not up to expectations, although the mills appear to find a market for their product, and are not accumulating stock to any extent. Prices are nominally unchanged, but in some instances very low figures have been named. Small lots of the best make are quoted about as follows:

Best Refined, Nos. 26, 27 and 28.... 3½¢ @ 3½¢
Best Refined, Nos. 18 to 25.... 3¢ @ 3½¢
Common, ¼¢ less than the above.
Best Sheet Iron, Nos. 26 to 28.... 4½¢ @ 4½¢
Best Bloom Sheets, Nos. 22 to 25.... 4¢ @ 4½¢
Best Bloom Sheets, Nos. 16 to 21.... 3½¢ @ 3½¢
Blue Annealed..... 2.8¢ @ 3¢
Best Bloom, Galvanized, discount..... 62½¢
Common, discount..... 67½¢

Merchant Steel.—There is an increased demand for the better grades, and prices show considerable firmness. Lots from store are quoted as follows: Tool Steel, 8½¢; Machinery, 2.6¢; Crucible Spring, 4½¢; Open-Hearth Ordinary Spring, 2.7¢ @ 2.9¢; Crucible Machinery, 5¢; Best Sheet Steel, 10¢; Ordinary Sheet, 8¢.

Steel Rails.—The market is very quiet, and there is not much reason to expect improvement in the near future. Steel, in other shapes, however, is in good demand, so that the mills are doing fairly considering the light demand for Rails. Prices are nominally \$29 at mill, but on desirable orders more or less shading would be done.

Old Rails.—Not a single transaction to report in this market. Holders of lots in store decline to name prices at present, but bids of \$23 to \$23.50 have been made but not accepted, as the parties expect to get more money for them later on.

Scrap Iron.—In good demand at about the following prices: \$20.50 @ \$21 for cargo lots; \$21.50 @ \$22 for carload lots, delivered, or for choice \$22.50 @ \$23; No. 2 do., \$14 @ \$15; Turnings, \$13 @ \$14; Old Steel Rails, \$20 @ \$21; Cast Scrap,

\$15 @ \$16; do. Borings, \$9 @ \$10; Old Fish Plates, \$25 @ \$26. Old Car-Wheels, \$17 @ \$18, Philadelphia, or its equivalent.

Wrought-Iron Pipe.—Business continues quite active, and all sizes of Pipe are in good demand, although prices do not improve to any great extent. Discounts are quoted as follows: Black Butt-Welded, 55 %; on Galvanized do., 45 %; on Black Lap-Welded, 65 %; on Galvanized do., 52½ %; on Boiler Tubes, 60 %.

Nails.—The general situation remains in about the same condition as noted last week. Stocks are accumulating preparatory to the fall trade, which at the moment looks like being a large one. It is intimated that Nails are being sold in and around Philadelphia at ruinous prices—some say as low as \$1.70 at mill. Lots from store are quoted at from \$1.90 to \$2.

Cincinnati.

CINCINNATI, September 17, 1888.

Pig Iron.—The local market for Pig Iron during the past week has been active and strong, with full values realized, but there has been no advance of moment, nor is one desired either by buyers or sellers at present. Individual sales have again been large, and the aggregate transactions have probably been in the neighborhood of 25,000 tons. All grades of Mill Iron have been sought, and there are very few brands of Foundry Iron which have not sold well. Ohio furnaces which accumulated Iron during the prevalence of low prices during the past summer have proved their wisdom and reaped a harvest, and not only have they disposed of stocks on hand, but have obtained large orders for delivery throughout the remainder of the year. At the moment, however, the feature of interest is the sudden and pressing demand for Car-Wheel Iron, both Southern and Northern production. With reduced stocks and increased consumption even in advance of the larger output, the confidence of sellers is apparently well guaranteed. Buyers tacitly admit the strong situation, but official returns are looked for with unusual interest. Among the large transactions have been 5000 tons No. 2 Southern Forge, 2500 No. 2 Southern Coke Foundry and 1000 tons Southern Car-Wheel, all on basis of quotations. The following are the approximate quotations for the local market, cash, f.o.b. Cincinnati:

Hot-Blast Foundry.

Southern Coke, No. 1.....	\$17.50 @ \$18.50
Southern Coke, No. 2.....	16.50 @ 17.50
Southern Coke, No. 3.....	15.50 @ 16.50
Ohio Soft Stone Coal, No. 1.....	17.00 @ 17.50
Ohio Soft Stone Coal, No. 2.....	15.50 @ 16.00
Mahoning and Shenango Valley.....	17.50 @ 18.50
Hanging Rock Charcoal, No. 1.....	20.50 @ 22.50
Hanging Rock Charcoal, No. 2.....	19.50 @ 22.00
Tennessee and Alabama Charcoal, No. 1.....	18.50 @ 19.50
Tennessee and Alabama Charcoal, No. 2.....	17.00 @ 18.00

Forge.

Strong Neutral Coke.....	14.75 @ 15.25
Mottled Neutral Coke.....	13.50 @ 14.00
No. 1. Mill Coke.....	15.00 @ 15.50
No. 2 Mill Coke.....	14.50 @ 15.00

Car-Wheel and Malleable Irons.

Southern Car-Wheel.....	20.00 @ 23.00
Hanging Rock, Cold Blast.....	22.00 @ 25.00
Lake Superior Car-Wheel and Malleable.....	20.50 @ 21.50

Manufactured Iron.—Foundries and rolling mills are reported well supplied with orders, and a firm tone prevails for all kinds of Manufactured Iron. Common Bar Iron, 1.90¢; Charcoal Bar Iron, 2.90¢ @ 3¢; Sheet Iron, Boiled, Nos. 10 to 27, 2.50¢ @ 3.25¢; Sheet Iron, Charcoal, Nos. 15 to 25, 3½¢ @ 4½¢ per lb.

Nails.—The jobbing prices have been advanced 10¢, with a fair demand, and there is some talk of a further advance of 10¢, but it is not generally obtained. Job-

bing prices are based upon 12d @ 40d, which sell at \$2.10 $\frac{1}{2}$ keg, with 10¢ rebate in carload lots, at mills. Steel Nails sell at \$2.10 and Steel Wire Nails at \$2.75 $\frac{1}{2}$ keg.

Old Material.—The importunities of buyers of Old Rails have increased rather than otherwise, but the offerings are small, and in the absence of trading no reliable quotations can be given, but \$25 seems to represent the market. Old Wheels, too, are scarce and wanted, and nominally quotable at \$22, spot.

Chicago.

Office of The Iron Age, 96 and 97 Washington St., CHICAGO, September 17, 1888.

Pig Iron.—The market has been quiet as compared with previous weeks, though a few good sales are reported, varying from 500 to 1000 tons each. It is believed that the leading consumers of Pig Iron in this vicinity have now nearly all placed contracts for the minimum quantity which they will need up to the close of the year. If their trade improves they will be obliged to increase their purchases, but at present the indications are not very favorable to an expansion of business on this account. The railroad companies are still economizing as much as possible, the architectural foundries report new work scarce, with almost a total lack of large building operations, and general foundries are running very light. The hand-to-mouth buying which is always in progress may be sufficiently large in volume, however, to absorb the furnace output still unsold and to maintain prices at the recent advance. This view is strengthened by the fact that some furnace companies hitherto holding back have lately pushed up their rates in line with the others. Stocks at the furnaces are diminishing, although production is increasing. There was a reduction in August of 19% in Coke stocks and over 9% in Charcoal. While it is possible that new influences may come into play which will revive the demand for Pig Iron and cause another upward movement, it is worthy of note that the market is now halting with no special tendency in either direction. Changes in the prices of particular brands may be rendered necessary by the advances in freight rates from points of production to this market. For instance, a new tariff is shortly expected on Pig Iron from the Mahoning and Shenango valleys. The present rate is \$2.25 $\frac{1}{2}$ ton, and the new rate will probably be \$2.50. On October 1st an advance of at least 25¢, and possibly 50¢, is expected in the freight rates on Southern Pig Iron. These changes inure to the benefit of local furnaces, whose prices have been kept down in order to hold their share of the market against outside competition. Very little is now being done here in Southern Pig Iron, particularly as the prices quoted for such brands as are not sold up are too high to result in business. Cash quotations, f. o. b. Chicago, are as follows: Lake Superior Charcoal all numbers, \$19.50 @ \$20.50; Alabama Car-Wheel, \$26.25; Southern Charcoal Foundry, No. 2, \$18.50; Jackson County Softeners, No. 1, \$18.25 @ \$18.75; Hocking Valley Soft Foundry, No. 1, \$17.50 @ \$18; American Scotch (Blackband) No. 1, \$19 @ \$20; other Ohio Scotch Irons, No. 1, \$18 @ \$18.50; Lake Superior Coke, No. 1, \$17.50 @ \$19; No. 2, \$16.50 @ \$17; No. 3, \$15.50 @ \$16; Southern Coke, No. 2, \$17.75 @ \$18; No. 2 $\frac{1}{2}$ and Ohio Bright, \$17.25 @ \$17.50; No. 3, \$16.75; No. 1, Mill, \$16.50.

Bar Iron.—Numerous inquiries are reported from would-be buyers at past prices, but they hesitate about making contracts for large quantities at the figures now named by the manufacturers. The usual quotations are 1.75¢ @ 1.80¢, half extras,

f. o. b. Chicago, for carload lots of Common Iron, with a very few mills willing to shade the lower figure, while others ask 1.85¢. The firm attitude maintained by the Mahoning Valley mills would seem to indicate that they find better markets than Chicago for the bulk of their output. The Pittsburgh mills evidently are in the same condition, as they quote as high a price, f. o. b. mill, as the ruling Chicago quotations. Jobbers have advanced their rates on small lots, from store, to 1.90¢ @ 2.10¢ for Common Iron.

Structural Iron.—The approaching close of the season is affecting the demand both for building and bridge work, and a limited business in this material is in progress, with some effect on prices. Mill lots are quoted as follows, f. o. b. Chicago: Angles, 2.25¢; Universal Plates, 2.30¢; Tees, 2.55¢; Beams and Channels, 3.40¢. Store prices continue at 2.40¢ @ 2.50¢ for Angles; 2.60¢ @ 2.70¢ for Tees, and 3.80¢ for Beams.

Plates, Tubes, &c.—An active business is reported in Plates, but the transactions of the week have been mainly in small lots. Quotations are firm but unchanged, as follows: Heavy Sheets, Nos. 10 to 14, 2.65¢; Tank Iron, 2.55¢; Tank Steel, 2.80¢; Shell Iron, 3¢; Shell Steel, 3.25¢; Flange Iron and Steel, 4¢; Fire-Box Steel, 4.75¢ @ 5.75¢; Boiler Rivets, 4¢ @ 4.25¢; Ulster Iron, 3.75¢; Boiler Tubes, 60% @ 65% off on 2 $\frac{1}{2}$ -inch and larger, and 62 $\frac{1}{2}$ % off on 2-inch and smaller.

Sheet Iron.—Large buyers seem to have about covered their requirements for the season. Mill representatives report but light sales and on these they have exacted still higher prices, now quoting No. 27 at 3.10¢, at mill, or 3.25¢, f. o. b. Chicago, but this price can, of course, be shaded on favorable deliveries. Jobbers have been compelled to advance their prices and now ask 3.20¢ for No. 24, 3.30¢ for Nos. 25 and 26 and 3.40¢ for No. 27, in small lots. A concession is made to best buyers.

Galvanized Iron.—The demand keeps up very well and manufacturers' agents are now sending even small orders to the mills because of their inability to fill them from their depleted stocks. The manufacturers selling cheapest have marked up their prices to the rates maintained by their colleagues and the jobbers have been obliged to follow suit. Quotations for small lots are now 60% off for Juniata and 60% and 5% off for Charcoal.

Merchant Steel.—Some deferred contracts were placed during the week by Agricultural Implement manufacturers, but otherwise the local market was without special feature. A fair jobbing trade is in progress. Prices from store are firmly maintained, as follows: Bessemer Bars, 2.30¢ @ 2.40¢; Tool Steel, 8 $\frac{1}{4}$ ¢ @ 9 $\frac{1}{4}$ ¢; Specials, 13¢ @ 25¢; Crucible Spring, 4.40¢; Open-Hearth Spring, 2.90¢; Open-Hearth Machinery, 2.75¢ @ 3¢; Crucible Sheet Steel, 7¢ @ 10¢.

Steel Rails.—Some small orders were taken during the week, but the manufacturers still report the condition of their branch of trade far from encouraging. Nevertheless, inquiries are increasing, and it would not be surprising if a decided change in tone should occur within the next four weeks. Railroad companies are asking for quotations on round lots, part to be delivered this fall and part next spring. The manufacturers prefer not to quote for next year, but are anxious to get all the orders they can for this year, and believe that orders will be placed on that basis when the railroad companies realize that they have taken a firm stand. Quotations are nominally \$30 @ \$31.

Old Rails and Wheels.—The excitement in Old Iron Rails seems to have sub-

sided for the present, but prices have not receded. Transactions are reported at rates ranging from \$24.50 to \$25.35. The supply is still limited, but apprehensions of great scarcity have been dissipated by the continual offerings made by railroad companies, who are collecting Old Rails from all along their lines to take advantage of the high prices now obtainable. Old Steel Rails are more active. A dealer secured 1000 tons at \$17.50, as they run. Consumers have paid from \$19.50 to \$21 for selected. Old Car-Wheels are subject to singular fluctuations, probably caused by preferences for particular makes. Small sales are reported at prices ranging from \$18.50 to \$20. The ruling rate is about \$19.50. The largest transaction reported is a sale of 250 tons at private terms.

Scrap.—Business has been fair among the local dealers, particularly in Wrought. For Cast the demand is quiet. The stock of Steel Scrap has been pretty well cleaned up. Inquiries for Wrought show that consumers are looking about for stock, and dealers are advancing their prices, in consequence of the renewed interest shown. Quotations for carefully selected are as follows, $\frac{1}{2}$ ton of 2000 lb: No. 1 Forge or Railroad Shop, \$20 @ \$20.50; Track, \$18.50; No. 1 Mill, \$15 @ \$15.50; Light Wrought, \$11; Horseshoes, \$18; Axles, \$25; Cast Machinery, \$13.50 @ \$14; Stove Plate, \$11; Cast Borings, \$9; Wrought Turnings, \$11; Axle Turnings, \$13; Coil and Leaf Steel, \$16; Locomotive Tires, \$16.50. Dealers are now offering \$13 @ \$14 for Mixed Country Scrap.

Hardware.—The demand for Heavy Hardware is very fair, while in Shelf Hardware there is a seasonable improvement, in which, however, some houses seem to be favored with a larger share than others. The demand is quite general, but a specially free movement is reported in Tools, Builders' Hardware, Screws, Nuts and Bolts. Prices are firm and in a few cases an upward movement is reported. Stove Boards have stiffened up to 60% off for Crystallized, and other kinds at corresponding rates, with somewhat of a scarcity in the supply. Solder is now held at 17¢ @ 18¢ for strictly half and half. Collections are very good for the season.

Nails.—Manufacturer's agents have had a quiet week, evidently doing but little to push trade. They quote prices on Steel Cut Nails at \$1.95 @ \$2.02 $\frac{1}{2}$ in large lots, f. o. b. Chicago. Jobbers also report but a limited demand, with small lots held at \$2.10 for Steel and \$2.65 for Wire Nails.

Barb Wire.—The demand is slowly improving, but as yet trade is confined almost wholly to small lots, very few carloads being called for. Manufacturers are receiving inquiries from heavy buyers, but their views as to prices are not close enough to result in immediate business. Nominal prices for small lots are still 3¢ for Painted, and 3.75¢ for Galvanized.

Pig Lead.—Consumers are believed to have secured about 500 tons of spot Lead during the week, at 4.80¢. The speculative demand has ranged from 4.80¢ to 4.85¢. At the close 4.75¢ was the best bid. Manufacturers of Lead Pipe and other Lead products state that the advances they have been obliged to make in consequence of the increased cost of Pig Lead has not restricted their trade, but they are compelled to watch the market very closely in order to secure themselves against possible reactions.

Louisville.

LOUISVILLE, KY., September 17, 1888.

Pig Iron.—The market continues firm, and advices from other points indicate that present prices of Iron are being held up. Where parties desire large blocks of

Iron for immediate delivery it is difficult to place orders, as furnaces generally are largely sold up to January. Silver Gray Iron continues very scarce, and but few Southern furnaces are able to furnish Iron of this quality. It is thought, however, that as soon as the wet season begins this grade of Iron will be more abundant. There is a movement on foot among Southern furnaces to change the grading of Iron, and make same correspond with the grading of Iron East. As,

No. 1 Foundry to be present No. 2 Foundry.
No. 2 " " " " No. 2 " "
No. 3 " " " " No. 1 Mill.
Gray Forge " " " " No. 2 " "
No. 1 Bright " " " " Open Bright.
No. 2 " " " " Medium or Close Bright.

Silver Gray Mottled and White to remain the same.

None of the new furnaces have yet come in blast, and it is difficult to tell when they will be making Iron, though it is thought some time during the course of the next 60 days. Current quotations are as follows:

Southern Coke, No. 1 Foundry....	\$17.00 @	\$18.00
" " " " " " " "	16.00 @	16.50
" " " " " " " "	15.50 @	16.00
Hanging Rock Coke, No. 1 Foundry....	17.25 @	17.75
" " " " " " " "	21.00 @	23.25
Southern Charcoal, No. 1 Foundry....	18.00 @	18.50
Silver Gray, different grades....	14.50 @	15.25
Southern Coke, No. 1 Mill, Neutral	14.75 @	15.25
" " " " " " " "	13.75 @	14.75
" " " " " " " "	14.25 @	14.75
" " " " " " " "	15.75 @	16.50
White and Mottled, different grades	13.50 @	13.75
Southern Car-Wheel, standard brands....	23.00 @	24.00
Southern Car-Wheel, other brands	19.25 @	21.25
Hanging Rock, Cold Blast....	22.25 @	25.25
Hanging Rock, Warm Blast....	19.25 @	20.25

Old Rails and Wheels are very strong, and but few lots are offered for sale, speculators and brokers having largely bought up all available amounts. Prices are \$24 for Old Rails and \$21 for Old Wheels.

Cleveland.

CLEVELAND, September 17, 1888.

Iron Ore.—One of the largest dealers in the city reports the sale of 20,000 tons of No. 2 Bessemer Ore at \$5.25, f.o.b. cars Cleveland. The same grade of Ore brought \$4.75 six weeks ago. Many transactions in a smaller way are being closed and the market seems to be fully as active as the most hopeful had anticipated for this season of the year. Transportation rates have advanced to \$1.30 from Escanaba; \$1.50 from Marquette, and \$1.75 from Ashland and Two Harbors. The season's shipments to date are slightly in excess of 3,000,000 tons, with indications of the season's output reaching figures somewhere between 3,750,000 and 4,000,000 tons. Following are the present quotations, f.o.b. cars lower lake ports:

No. 1 Specular and Magnetic Bessemer Ore....	\$6.00 @	\$6.15
No. 1 Specular and Magnetic Non-Bessemer Ore....	5.25 @	5.50
Red Hematite Bessemer Ore....	5.00 @	5.25
Red Hematite Non-Bessemer Ore....	4.20 @	4.40
Menominee Range Bessemer Ore....	5.25 @	5.50
Menominee Range Non-Bessemer Ore....	4.00 @	4.25
Gogebic Range Bessemer Ore....	5.25 @	5.50

Pig Iron.—Sales of No. 1 Strong Foundry and of No. 1 Soft Silvery have occurred at an advance of 50¢ per ton above last week's quotations. It is doubtful, however, whether furnacemen are advancing prices in proportion to the steadily increasing demand which is rapidly clearing up the supply, both present and prospective. The market is very firm at the following cash quotations:

No. 1 to 6 Lake Superior Charcoal....	\$20.50 @	\$21.50
No. 1 Strong Foundry, Bessemer quality, per ton....	18.20 @	19.00
No. 1 Strong Foundry, per ton....	17.70 @	18.30
No. 2 Strong Foundry, per ton....	16.70 @	17.30
No. 1 American Scotch, per ton....	18.25 @	18.70
No. 2 American Scotch, per ton....	17.20 @	17.70
No. 1 Soft Silvery, per ton....	18.50 @	19.00

Mahoning and Shenango Valley Neutral Mill Irons, per ton....	16.00 @	16.70
Mahoning and Shenango Valley Red Short Mills, per ton....	17.00 @	17.70

Scrap Iron.—There is a fair demand for No. 1 Wrought at \$19 @ \$19.50. A few sales of Old American Rails at \$25 are reported.

Manufactured Iron.—Additional sales of Common Bar in round lots at \$1.65 are reported.

Nails.—The market is fairly active. Steel Nails bringing \$2.10 and Iron Nails \$1.95, while the demand for Steel Wire Nails at \$2.60, from store, continues heavy.

Chattanooga.

Office of *The Iron Age*, Carter and 9th Sts., CHATTANOOGA, September 17, 1888.

Pig Iron.—The condition of the market is conservative, yet strong at outside quotations. The tendency to purchase for speculative purposes has fallen off to some extent, but there is still a disposition to lay by a few 100 and 500 ton lots by parties who are known to be other than consumers. So far as can be ascertained, the sales made during the week have not fallen off in price, and all that is being turned out is being shipped as fast as made. For the past few weeks the West appears to have been the best market, so far as prices are concerned, although some large lots have found a market at Eastern ports. A movement is on foot by combined Southern and Northern capital to establish a regular line of steamers to run between Savannah and all the principal Eastern ports, for the express and nearly exclusive purpose of transporting Pig Iron and Iron Ore to these points. Should this be carried out as fully as contemplated, trains will be put on that will run exclusively for this trade, and a very large business is anticipated, which will result in materially reducing the expense of putting Iron and Ore into the hands of the consumers. We note sales of No. 2 Foundry in round lots at \$14, net, cash, at furnace bank, and in carload lots at \$14.50 @ \$15, and of No. 1 at \$16 @ \$16.50, on a basis of 60 days, at furnace bank.

Bar Iron.—All the Southern mills are running to their utmost capacity at 1.70¢ rate in carload lots. It is selling from stores at 2.50¢ @ 3¢ rates.

Detroit.

WILLIAM F. JARVIS & Co., under date of September 17, report as follows: Analyzing the Pig-Iron market, we should say that by far the most difficult Iron to obtain at ruling prices is Lake Superior Charcoal. Nearly every one reports their stock as well sold up, and advances ranging from 50¢ to \$1 per ton above ruling quotations are obtained for particular grades. Next to the scarcity of Lake Superior Charcoal can be placed Gray Forge Iron. The large demands made upon the manufacturers by the Pipe works and rolling mills have forced prices to a very strong basis. Southern Foundry Irons are easy to obtain, and, while no concessions are granted, a strong pressure brought to bear upon these higher grades may be more effective than upon the lower. While the earlier call for Ore from Lake Superior was confined chiefly to the Bessemer mines, non-Bessemer now seems to have the call, but prices are not higher net to the miners than formerly, owing to the advance in Lake freights. At the same time a larger volume of Ore is being shipped weekly now than in 1887, and it is expected that right up to the close of navigation vessel capacity will be used to its fullest extent in carrying ore. This is evidenced already by the majority of the vessels going back from Lake Erie ports light in order to save time and take advantage of the Ore

freights as they exist to-day. Altogether the market is very healthy and strong and is fairly quotable to-day as follows:

Lake Superior Charcoal, all numbers....	\$20.00 @	\$20.50
Lake Superior Coke, all ore....	19.75 @	20.25
Lake Superior Coke, cinder mixed	18.50 @	19.00
Standard Ohio Black Band....	19.75 @	20.25
Southern No. 2....	17.75 @	18.25
Southern Gray Forge....	16.25 @	16.75
Southern Silvery....	17.00 @	17.50
Jackson County (Ohio) Silvery....	18.50 @	19.00
Old Wheels....	20.50 @	21.50

Pittsburgh.

Office of *The Iron Age*, 77 Fourth Ave., PITTSBURGH, September 18, 1888.

Pig Iron.—The market has been less active during the past week, and, while prices are still maintained, the feeling prevails on the part of buyers that for the time at least the highest price has been reached. Consumers generally are well stocked. Some of them have covered their requirements for the remainder of the present year, and, having contracted at prices away below those now ruling, it is not strange that they are holding off, especially as there has, as yet, been no corresponding advance in the products. The furnaces are well sold up—many of them have contracts sufficient to absorb all they can make during the remainder of the present year. Therefore, while the market is not as excited as it has been, and there has been little or no change in prices for a couple of weeks, it is in a healthy condition. Thus far, furnacemen, if anything, have the best of it, for notwithstanding the improvement in price there has been but little, if any, cost added to production, while consumers, as already noted, have as yet been unable to get the price for their products up correspondingly. We quote as follows:

Neutral Gray Forge....	\$15.75 @	\$16.50	cash.
All Ore Mill....	17.00 @	17.25	"
White and Mottled....	14.75 @	15.00	"
No. 1 Foundry....	17.75 @	18.25	"
No. 2 Foundry....	17.00 @	17.50	"
No. 3 Foundry....	15.75 @	16.25	"
No. 1 Charcoal Foundry....	23.00 @	24.00	"
Cold Blast Charcoal....	25.00 @	26.00	"
Bessemer Iron....	18.00 @	18.50	"

So far as we can learn there have been no sales of Neutral Gray Forge made above \$16.50, cash, and but few at that; most of the sales during the past week were at \$16 @ \$16.25, cash. In regard to Bessemer we have failed to learn of any sales above \$18, cash, and we understand that it can still be obtained at this figure.

Muck Bar.—We continue to quote at \$29 @ \$29.25, cash, for good strong Neutral. There is not the demand there was a few weeks ago, although there is not much offering. Large buyers for the present appear to be pretty well supplied. However, there is no disposition that we can hear of to make concessions in order to effect sales.

Manufactured Iron.—There is nothing particularly new to note. Manufacturers continue to complain that the raw article is still higher relatively than the products, that as yet they have been unable to get a proportionate advance for the latter. There is a very fair business; the mills are nearly all in operation, some of them working double turn, but, as already intimated, prices are unremunerative and unsatisfactory. We continue to quote upon a basis of 1.80¢ @ 1.85¢ for Bars, 60 days, 2% off for cash. Mills making a specialty of Skelp Iron are quite busy, and this kind of Iron has been advanced from one to two tenths as compared with the lowest point.

Nails.—The Nail trade does not show much improvement in demand, but prices are better. Makers are now able to realize full card rates, and it is evident that there has been an advance. It could not well be otherwise, in view of the fact that Nail Plate has advanced from \$1 to \$1.50 per ton and makers could not afford to pay

the advance for Plate and sell Nails below the card. We continue to quote 12d to 40d at \$1.90, 60 days, 2% off for cash.

Wrought-Iron Pipe.—There is a continued good demand, especially for small sizes, and the mills generally are fully employed, some of them working up to their full capacity. Prices have been advanced during the past week. There was no meeting of manufacturers, but the advance was made by telegraph, a mutual agreement having been made by all the mills to adhere to prices quoted. Discounts on Black Butt-Welded Pipe, 55%; on Galvanized do., 50%; on Black Lap-Welded, 65%; on Galvanized do., 55%; $\frac{1}{2}$ casing, 40¢ per foot net; 2-inch Tubing, 13¢; Boiler Tubes, 65% off, large lots.

Old Rails.—There has been but little change in the market during the past week; demand appears to have fallen off somewhat, but offerings continue light. American tees may be quoted at \$25, at which figure a sale of 1000 tons was reported. Foreign Tees cannot be laid down in Pittsburgh at the price quoted for American, and while this is the case it is not likely that there will be any sale made of the former in this market.

Steel Rails.—No new business reported here, and prices are nominally unchanged. The new Rail mill of the Duquesne Company will, it is expected, be ready for business about the 1st of January next.

Billets, &c.—Bessemer Steel Billets are still quoted at \$29, cash, delivered on cars at maker's works; some makers quote 50¢ @ \$1 higher, but very few, if any, sales have been made above price quoted. Nail Slabs also quoted at \$29. Sales of Domestic Crop Ends at \$19.

Railway Track Supplies.—Prices remain as last quoted: Spikes, 2¢, 30 days, delivered; Splice Bars, 1.80¢ @ 1.85¢; Track Bolts, 2.85¢ with square, and 2.95¢ with Hexagon Nuts.

Old Material.—There is a continued steady demand, and prices are steady as quoted: No. 1 Wrought Scrap, \$21, net ton; Car Axles, \$26, net ton; Wrought Turnings, \$13.50 @ \$14; Cast Scrap, \$15.50 @ \$16, gross; Old Car-Wheels, \$20; Cast Borings, \$12.50 @ \$13, gross.

New York.

Office of *The Iron Age*, 66 and 68 Duane street, New York, September 19, 1888.

American Pig.—The Pig Iron market has not materially altered during the week under review. The opinion is held by some that prices will likely advance but no immediate change is anticipated. In the meantime current quotations are firmly adhered to and there is no disposition shown to shade prices. The volume of trade for the week has been light, most of the dealers reporting only small sales, and, in fact, the sum total of the business thus far this fall has not been of any large proportions. Advices from the West bring very encouraging accounts but though they tend to promote a hopeful feeling in this section there is no actual improvement to note here. A good deal of Iron is being delivered at present on old contracts, but few new orders are being placed. The product of the Southern furnaces is pretty well sold for delivery both East and West and consequently there is little doing in this department. The supplies of Foundry Pig are not large and any considerable increase in demand would bring about scarcity. Prices are as last quoted. The Thomas Iron Co., who report sales of a few thousand tons during the week, continue dry, quote \$18 as the price for No. 1 Foundry other sellers, however, are asking \$18.50, and for choice quality \$19 is obtained. No. 2 Foundry we continue to quote at \$17 @ \$17.50 and Gray Forge \$15.75 @ \$16.25.

Scotch Pig.—The strength exhibited by the foreign market and the rise in the ocean freight rates have stiffened prices here, and as a result but little business is being done. The current imports are of ordinary volume, but stocks here are said to be light. While it is true that a strong feeling pervades the market, there is little actual change to report. Importers are quoting Coltness from \$21 to \$22; Shotts, \$20 @ \$20.50; Langloan, \$20.50, and Dalmellington, \$19.75.

Structural Iron.—The quotations in this department are the same as a week ago. The mills are pretty well employed, and prices, though unchanged, are firm. We quote for round lots, on dock: Sheared Plates, 2¢ @ 2.10¢; Universal Mill Plates, 2.1¢ @ 2.15¢; Angles, 2.1¢ @ 2.15¢; Tees, 2.5¢ @ 2.7¢ and Channels and Beams, 3.3¢.

Plates.—There is nothing new to report concerning this market. Trade is moderately active, and prices are firmly held. We quote for round lots, on dock: Iron Tank, 2¢ @ 2.10¢; Shell, 2.25¢ @ 2.4¢; Steel Tank, 2.25¢ @ 2.3¢; Shell, 2.4¢ @ 2.5¢; Flange, 2.65¢ @ 3¢, and Fire-Box, 3.5¢ @ 4¢.

Steel Rails.—No definite news has been received from England concerning the revival of the International Rail Association. A cable dispatch to one of the daily papers, a few days ago, stated that no agreement had been made, the representatives of the German Rail mills who went to London failing to reach any definite result, but that they would return and resume negotiations next week. On the other hand, it is rumored that the combination had been effected, but, whether or no the rumor is true, it is generally believed that a definite agreement will be reached, and that the present delay is only due to the discussion of details. In the market here there is nothing new to notice. The trade is quiet, and we do not hear of any large contracts being placed. Prices are moderately firm, but the rise in Bessemer Pig has not led to any advance in Rails. We continue to quote \$28.50 @ \$29 at Eastern mill, though we are told that some small orders have been placed at lower figures. A good many Steel Rails have been sold for delivery next year, aggregating in all something like 200,000 tons.

Old Rails.—The market is very firm and holders are advancing prices. The views of buyers and sellers are, however, so wide apart that actual business is restricted. The lot of 1000 tons of Tees, referred to in our last issue as being offered by the New Haven Railroad, was sold, but the price is not known, though it is rumored that they went at \$24. It should be borne in mind, however, that the Rails were to be delivered in New Haven or Bridgeport. The only other important transactions we hear of are 5000 to 7000 tons of Tees by the Boston and Maine Railroad, at \$25, for consumption in Massachusetts, and a lot of 2200 tons of Double Heads, 1600 tons of which brought \$24.25 and the remainder \$24.87 $\frac{1}{2}$, ex-store, New York. A few small lots of Double Heads are also reported sold at \$24.50. There are orders for many thousand tons of Old Rails in the market, but buyers are not disposed to place them at current quotations. But few Rails are being imported and stocks are light, the whole amount in store here being variously estimated at from 7000 to 10,000 tons, all of which are in the hands of a limited number of holders. We quote Tees \$25 and Double Heads \$26 as sellers' asking price.

Fastenings.—With the advance of the Old-Rail market Fastenings are showing considerable strength, but there are no

noticeable changes in price. The market is quoted as follows: Spikes, \$2.15 @ \$2.20, and Angles, 2.05¢.

Scrap.—There is a very active demand for Scrap, but, as many of the yards are bare of stocks, consumers are experiencing more or less difficulty in obtaining supplies. No. 1 Wrought-Iron Scrap may be quoted at \$20 out of yard, and Selected Scrap is bringing \$21.

Wire Rods.—The consumptive demand for foreign Wire Rods continues light, and, compared with previous years, the importations are of small volume. Stocks here are scarce. We continue to quote the market at \$39.50 @ \$39, but for early shipment \$40 is the ruling figure.

Financial.

The severe rain storms of the past week have interrupted freight transportation, and disastrous floods in South Carolina, Georgia and other agricultural sections have caused heavy losses on rice and cotton plantations. Bad crop reports from the Northwest caused much excitement on the Produce Exchange on Monday, and despite recent accounts respecting the favorable progress of the harvest wheat and corn both advanced, serving to offset the decline of about 2¢ $\frac{3}{4}$ bushel since our last report. The Washington weather crop bulletin states that the reports from the corn belt indicate that the weather during the past week was very favorable, and that the corn crop, which is very large, is generally secure and past injury from frost. The frost which occurred during the week along the northern border of Iowa, and in Minnesota, Wisconsin and Michigan, did some damage to crops which were yet immature. Taking all in all the general business situation is good, with the drawbacks noted. Wholesale grocers in this city report that the order trade from the South is at least as good as usual at this time of year, notwithstanding the Florida epidemic. Railways are burdened with freight, especially in the Lake regions, where ore, grain, &c., are being pushed forward with dispatch. On the Canada side there is some preparation in anticipation of the enforcement of retaliatory measures, the idea being to make winter shipments of cargoes via Halifax and St. John's. At Pittsburgh receipts from the lakes are remarkably large, and there is an increased movement of ore, coke and iron. The shut-down in oil will be discontinued November 1. Quite a fleet of English "tramp" steamers now due have been chartered to load cotton at New Orleans at 55¢. Railroad earnings for August are increased 2 $\frac{1}{2}$ % nearly, as compared with last year. The disturbance in trunk-line tariffs continues.

The Stock Exchange markets were much agitated by the unexpected passing of the semi-annual dividend on St. Paul common stock and reducing the rate on preferred from 7% to 5%. London selling became general and other stocks were seriously affected. The decline was accelerated by the advance of the Bank of England rate of discount, and an advance from 2 $\frac{1}{4}$ % to 3 $\frac{1}{4}$ % by the Bank of France. On Friday following the market continued unsettled and weak, and in the course of three days the average price of 60 stocks declined more than it had advanced during the previous fortnight. Fluctuations were wide and active. Outside of the Grangers, Missouri Pacific was the chief feature. The weakness was owing to the published report from Denver, afterward denied, that the road is to increase its capital stock by \$6,000,000. On Monday the market closed strong. On Tuesday the market opened at a decided advance for St. Paul and the other grangers, and the market was generally strong. On

Wednesday the improvement continued, with Lake Shore at 99½, the highest in two years.

United States bonds are quoted as follows:

U. S. 4½s, 1891, registered	106½
U. S. 4½s, 1891, coupon	106½
U. S. 4s, 1897, registered	124¾
U. S. 4s, 1897, coupon	124¾
U. S. currency 6s	121

The bank clearings of 38 cities last week show an increase of 3.1 % compared with last year. Outside of New York the increase is 4.8 %. New York gained 8.9; Boston, 1.5; Philadelphia, 11.2; Chicago, 7.7; St. Louis, 14.9; Kansas City, 14.7; Louisville, 9.9; Milwaukee, 7.8; Omaha, 17.3; Denver, 10.5; Peoria, 21.5, and Topeka, 36.9 %. Cincinnati lost 5.8; St. Paul, 2.2; Minneapolis, 6.9; Galveston, 13.6; Memphis, 23.2; Duluth, 7.2, and Norfolk, 11.8 %.

The weekly bank statement showed a gain of about \$500,000 in surplus reserve, which is now \$12,423,875 in excess of legal requirements, as compared with \$3,810,675 a year ago, and \$7,682,125 in 1886. The changes in the averages are unusually slight, owing to the fact that the drain of currency to the West and South has been partly counterbalanced by the release of money by the Treasury on account of recent purchases of bonds. As the purchase of bonds on Thursday and Friday was not comprised in the statement, the banks on Saturday night were fully \$4,000,000 stronger than represented. The exports of specie from this port during the week were \$245,000, and the imports \$410,000. Since January 1 the amounts, respectively, are \$27,690,000 and \$6,440,000.

The money market is gradually hardening, as appears in a perceptible advance in time money as well as discounts. The movement of currency into the interior was heavier than before since the fall demand began to be felt. The rates for time loans were 4 @ 4½ % for four months or less, and 5 % for four to six months on good collateral. Commercial paper was in very full supply, but the demand was light. Rates were quoted 5½ @ 7½ %, according to the grade of paper and the time to run. Confidence was expressed that the policy of the Treasurer in buying bonds, if reasonable prices are named, is adequate to prevent undue stringency. The advance of the minimum rate of discount of the Bank of England to 4 % still further strengthened sight and cable bills. The leading drawers of sterling put up the sight rates to \$4.89 and \$4.89½, so that quotations were near the gold exporting point, but no outward movement of precious metals is looked for in prospect of liberal exports of cotton and breadstuffs. For the present the high rates of ocean freight operate to restrict shipments within narrow limits.

The preliminary statement by the Bureau of Statistics of the exports of the United States in August shows a decrease of \$8,175,983, or 22 per cent., as compared with last year, the falling off having been principally in cotton and breadstuffs, the exports of these two articles having been \$8,066,816 smaller than in 1887. Dairy products and hogs show a falling off, but the other items show gains over last year. The following is a comparison of the August exports with those of last year:

	1888.	1887.
Cotton.....	\$2,853,327	\$4,562,886
Breadstuffs	12,023,687	18,380,444
Provisions.....	6,272,184	6,104,306
Cattle	1,436,113	1,290,104
Hogs	400	16,490
Mineral oils.....	4,676,333	4,384,374
Dairy products	1,620,587	2,370,927
Total.....	\$28,879,631	\$37,055,614

The *Chronicle* gives a statement of the cotton crop of the United States for the year ending September 1, 1888. It shows that the total crop reaches 7,017,707 bales,

while the exports are 4,638,981 bales, and the spinners' takings are 2,230,294 bales, leaving stock on hand at close of year 181,285 bales. Crop for year 1886-7 showed 6,513,623 bales; 1885-6, 6,550,215 bales.

The imports of merchandise at this port during the week were large, amounting to \$10,185,000, of which \$2,369,000 represent dry goods. Since January 1, the total is \$335,374,000, as compared with \$335,348,000 for the same time last year and \$11,360,000 in 1886. Exports for the week were \$5,371,680: total since January 1, \$205,166,000, against \$219,398,000 for same time last year.

Coal Market.

The Anthracite Coal trade remains comparatively quiet as respects new orders, but heavy deliveries are in progress under contracts made prior to the last advance, and the activity at the mines is extraordinary. The Wyoming region alone produced upward of 500,000 tons, and the aggregate from the three great mining fields is no less than 935,523 tons, an output for a single week rarely, if ever, surpassed. Compared with the previous week, the increase is 54,000 tons. Since January 1 the aggregate is 25,821,030 tons, an increase of nearly 2,000,000 tons over the same time in 1887. The output for five weeks compares as follows:

Week ended August 18.....	920,922
Week ended August 25.....	832,058
Week ended September 1.....	844,665
Week ended September 8.....	881,802
Week ended September 15.....	935,523

It does not yet appear that any considerable amount of business has been done at the advanced prices, but prices are understood to be firm, except for Broken and the smallest steam sizes, which accumulate. For Pea Coal it is said that buyers can make their own terms. Quotations are as follows:

	Broken.	Egg.	Stove.	Cnut.
Hard white ash.....	\$4.15	\$4.40	\$4.65	\$4.55
Free white ash.....	3.95	4.30	4.05	4.55

Fancy grades range about 4.50¢ @ 4.90¢. The movement of Coal Eastward has been expedited, to take advantage of current rates by small sailing vessels, but the Western demand has fallen off. The chances of lower prices for Coal in October or November, at the furthest, are the subject of discussion. Individual operators feel strongly respecting the alleged preference shown to corporations in supplying cars. At Wilkesbarre several large operators charge the railroads with carrying Bituminous Coal for a less rate than Anthracite, and have engaged legal counsel to appear before the Interstate Commerce Commissioners.

The Bituminous Coal trade is fairly active, with some cutting on the lower grades. The supply as well as the consumption steadily augments in volume. The Philadelphia *Ledger* says: "The extension of the new lines constructed chiefly to feed the Pennsylvania Railroad within the past couple of years has resulted in increasing the tonnage brought to it from the Cumberland region this year 318,000 tons, and from the Broad Top mines 14,773 tons. The Bituminous output from all the other regions has also largely increased. The Clearfield tonnage has increased 32,197 tons. The Pocahontas Flat Top region, which was opened about 1883, has grown to be an important factor in the Soft Coal trade, and already this season 1,070,384 tons have been brought from the mines in that district, an increase of about 300,000 tons. The Beech Creek, the youngest and "most obstreperous" Bituminous Coal road, in which the Vanderbilts are believed to have an interest, has carried to market thus far in 1888 1,161,000 tons, or about 840,000 tons more than it

did last year to the same date." The Pennsylvania Road last week transported 217,000 tons of Coal, and during the year 7,976,000 tons, an increase of nearly 900,000 tons compared with 1887. Reading last week shipped 205,000 tons of Coal, of which 43,000 tons were delivered at Port Richmond and 13,000 at Elizabethport.

Imports.

The imports of Iron and Steel, Hardware, &c., at this port from September 7 to September 15, inclusive, and from January 1 to September 15, inclusive, were as follows:

Iron and Steel.

	Sept. 7 to Sept. 15.	Jan. 1 to Sept. 15.
Pig Iron: Henderson Bros.....	300	1,475
Crocker Bros.....	300	8,073
N. S. Bartlett.....	100	4,200
James Williamson & Co.....	100	3,900
Knauth, Nachod & Kuhne.....	15	15
Spiegelstein: Dana & Co.....	1,004	2,408
Naylor & Co.....	400	7,219
Crocker Bros.....	398	8,907
Post, Martin & Co.....	320	320
Gelsenheimer & Co.....	30	225
Steel: G. Lundberg.....	100	206½
Naylor & Co.....	25	583
W. F. Wagner.....	8	1,001
F. S. Pilditch.....	6	327
Chas. Hugill.....	3	215½
R. F. Downing & Co.....	3	184½
C. F. Boker.....	3	179½
Wetherall Bros.....	2	7
Temple & Lockwood.....	2	9
Steel Rods: Naylor & Co.....	766	15,521
Cary & Moen.....	23	683
Steel Sheets: R. F. Downing & Co.....	57	60
Pierson & Co.....	31	879
Williams & Whitney.....	29	29
Naylor & Co.....	17	490
Lalanc & G. Mfg. Co.....	15	457
R. Crooks & Co.....	10	323
Steel Forgings: Thos. Prosser & Co.....	144	3,642½
Steel Crop Ends: Naylor & Co.....	580	2,330
Steel Billets: A. Milne & Co.....	44	553
J. Abbott & Co.....	40	1,528
Steel Plates: Naylor & Co.....	40½	235½
Steel Nail Rods: J. Abbott & Co.....	37	241
Steel Wire: J. Abbott & Co.....	12	12
Steel Shafts: Pratt & Whitney Co.....	33	33
Sheet Steel: Ordren & Wallace.....	4	4
C. B. Seabury.....	2	2
Pierson & Co.....	2	2
Iron: J. Abbott & Co.....	153	6,816½
Bacon & Co.....	172	302
R. F. Downing & Co.....	10	115
E. G. Jacobus.....	1	29
Iron Rods: Bacon & Co.....	114	114
Rivet Rods: J. Abbott & Co.....	582	3,837
Muller, Schall & Co.....	52	170
Iron Girders: W. H. Wallace & Co.....	16	311
R. F. Downing & Co.....	15	409
Sheet Iron: T. B. Coddington & Co.....	40	1,078
Iron W. Rods: N. Lillenberg.....	150	150
Swedish Iron Bars: Naylor & Co.....	100	100
Iron Beams: G. W. Sheldon & Co.....	128	128
R. F. Downing & Co.....	35	291
Merchants' Despatch Co.....	18	18
Iron Kings: Thos. Prosser & Son.....	2	3
Iron Wheels: R. F. Downing & Co.....	10	46
Cotton Ties: Naylor & Co.....	350	4,559
Wheelock & B.....	100	250

	Pounds.	Pounds.
Russia Sheet Iron: Bruce & Cook.....	108,578	108,576
Swedish Iron Qivet Rons: C. v. Philp.....	97	157

Tin Plates.

	Boxes.	Boxes.
Phelps, Dodge & Co.....	17,635	393,002
A. A. Thomsen & Co.....	8,505	98,277
Dickerson, Van Dusen & Co.....	5,572	193,930
Pratt Mfg. Co.....	4,273	128,732
N. L. Cort & Co.....	3,937	78,076
T. B. Coddington & Co.....	3,185	125,478
R. Crooks & Co.....	2,873	52,314
Bruce & Cook.....	2,882	75,382
G. B. Morewood & Co.....	2,000	35,689
Jas. Byrne & Son.....	1,891	28,189
Central Stamping Co.....	1,282	25,312
S. Shepard & Co.....	665	16,318
E. S. Wheeler & Co.....	624	5,608
H. V. Whittemore & Co.....	620	44,105
C. S. Mersick & Co.....	514	5,256
Lombard, Ayres & Co.....	440	10,712
H. R. Demilt & Co.....	387	15,511
Hamilton & M.....	362	362
American Metal Co.....	208	496
Lalanc & G. Mfg. Co.....	194	4,004
Merchant & Co.....	110	16,722
N. & G. Taylor Co.....	85	245

Metals.

	Pounds.	Pounds.
Antimony: Edw. Hill's Sons & Co.....	75	1,250
American Metal Company.....	50	205
Phelps, Dodge & Co.....	30	470

Tin: Naylor & Co.	246,808	1,957,219
Muller, Schall & Co.	224,512	8,345,825
R. Crooks & Co.	172,449	406,082
American Metal Company	145,729	1,136,425
Waltham, Trotter & Co.	44,712	44,712
Hendricks Bros.	21,060	236,781
Lehmaler Sons & Company	13,888	28,819
Phelps, Dodge & Co.	11,183	1,496,100
Old Brass: Bowering & A.	5,468	5,468

Irons and Metals Warehouse from September 7 to September 15, inclusive:

Russia Sheet Iron: A. A. Thomsen & Co.	Pounds.
	322,736

Hardware, Machinery, &c.

Barbour Bros. Co., Moh'y. cs, 15	
Baker, Hermann & Co., Mdse., cs, 12; Arms, cs, 10	
Bernard Geo., Ironwork, cs, 23	
Baker, Carl F., Mdse., cs, 18	
Budde & Westerman, Hdw., cs, 1	
Cobiere, Fellows & Co., Moh'y., cs, 13	
Degroun, Aymar & Co., Cables, 10; ditto oks, 8	
Field, Alfred & Co., Mdse., cs, 22	
Foley, E., Moh'y., cs, 10	
Fraser, P. A. & Co., Hdw., cs, 2; Mdse., cs, 1	
Gould, R. S., Tubes, cs, 3	
Hoe, R. & Co., Mdse., cs, 1	
Johnson, John & Co., Moh'y., pgs, 44	
Lau, J. H. & Co., Arms, cs, 7	
Leeming, T. & Co., Enamelled Iron Plates, cs, 1	
Meacham Arms Co., Mdse., cs, 19	
Montgomery & Co., Hdw., bxs, 4	
Morris, A. S., Gun Barrels, cs, 1	
Pilditch, F. S., Mdse., cs, 196	
Schoverling, A., Arms, cs, 38	
Shoverling, Daly & Gales, Arms, cs, 11; Hdw., cs, 5	
Steglich & Baese, Moh'y., cs, 11	
Strauss, L. & Sons., Lanterns, cs, 6	
Underhill, A. M. & Co., Guns, cs, 1	
Wiebusch & Hilger, Lim. Hdw., cs, 8; Mdse., cs, 6	
Witte, John G. & Bro., Cutlery, cs, 5	
Order: Steelware, pgs, 360; Moh'y., cs, 4; do., pgs, 28; Cutlery, pgs, 5	

Exports of Metals.

	September 7 to Sept. 15.	Jan. 1 to Sept. 15.
	Pounds.	Pounds.
Copper: J. Abbott & Co.	620,000	10,673,619
Lewisohn Bros.		3,929,022
F. A. Lomal.		2,581,293
American Metal Company	112,099	5,261,084
G. H. Nichols.		223,939
J. Bruce Ismay.		112,000
S. Mendel.		580,000
Ledoux & Co.		110,276
Muller, Schall & Co.		430,000
Copper Queen Con. M. Company.		224,034
J. Kennedy, Tod & Co.		112,028
H. Becker & Co.		1,250
Orford C. & S. Rtg. Company		449,881
Robt. M. Thompson.		125,000
Thos. J. Pope, Sons & Co.	85,000	1,097,130
J. Parsons & Co.		206,250
Naylor & Co.	280,000	280,000
Bridgeport Copper Company.		112,000
C. Herold.		250,000
Phelps Bros.		6,250
R. W. Jones.		189,984
Ladenburg, Thalmann & Co.	229,371	229,371
W. H. Crossman & Bro.		4,000
R. Crooks & Co.	1,000	1,000
Copper Matte: Williams & Terhune.		34,382,598
Lewisohn Bros.		3,721,610
American Metal Company		2,236,873
J. Abbott & Co.		295,000
C. Ledoux & Co.		485,801
F. W. J. Hurst.		184,288
G. H. Nichols.		722,777
H. T. Nichols & Co.		180,965
Kunhardt & Co.		41,652
Copper Ore: American Metal Co.	119,000	343,000
Pig Iron: P. Wright & Sons.	100	280

Metal Market.

Copper.—Since our last week's report spot Chili Bars suddenly dropped in the London market from £95 to £91, but subsequently recovered to £101 and declined to £96 yesterday and to £95 to-day. Futures meanwhile remained unaltered, £79; good, merchantable brands improved from £76 to £76.10. The visible supply in England and France is cabled at 75,474 tons on September 15, against 84,110 on on September 1, but in reality there is improvement as the difference is merely a shipping of stock from France to get money loaned on it somewhere. This temporarily reduces the stock of Chili Bars there, and while this Copper is in transit it looks as though it must have gone into consumption. Such kind of dodges can do the main holders no good, because they deceive nobody who watches things closely over there. Here the market has been pretty much stagnant; at 16½¢ spot the syndicate sells consumers; to speculators at 17½¢; 17.20¢ is the quotation for Sept., and 17.05¢

@ 17.10¢ for the later months. The new Calumet and Hecla vertical shaft is called the Whiting shaft; rock has commenced to be hoisted from No. 3 Calumet shaft. Another vertical shaft to be sunk immediately is to bear the name of the Calumet and Hecla and West shaft; it will be back of No. 4 Calumet; the output in August was 3088 tons; September is expected to produce 500 tons more than August. Rio Tinto rose 1½ francs at Paris last week. The closing spot quotation is 17½¢ @ 17½¢.

Tin.—London since Wednesday last week gave way with spot Tin from £103.10/ to £99, and with futures from £104 to £99.10/, but since then there was a return to the previous high ruling, spot coming £103.15/ yesterday and £103.10/ to-day, while futures were £104.5/ yesterday and came £104 to-day. In a jobbing way Tin is worth here 23½¢ spot, and 23½¢ 30 days, with a very moderate trade, whereas the speculative quotations are 22.55¢ September and 22½¢ October, 23½¢ being offered on the spot and 23½¢ asked. Although it is conceded that the statistical position is improving the continual wide fluctuations in London unsettle everything, and the price is now high enough to recommend extreme caution. **Tin Plates.**—There has been a fair demand for them; in fact, all the stock on hand can meet. Certain sizes are exceptionally, nay, abnormally, high; thus, IC and IX 14 x 20 Charcoal advanced about 50¢ per box, and will, of course, recede the moment supplies come in; 14 x 20 Cokes also continue scarce, and command \$4.65. The advance noted last week in futures still holds good. We quote at the close, large lines, per box, on the spot: Siemens-Martin Steel, Charcoal finish, \$5.25 @ \$5.75; Coke finish, \$4.75; Terns, \$4.30 @ \$4.40; Bessemer Cokes, \$4.65, and Wasters, \$4.30. Cokes remain 14/ in Liverpool.

Lead.—Hardly anything has transpired in the way of sales outside of the exchange, only carloads changing hands at 4.95¢ @ 5¢. The bull clique of speculators now hold 20,000 tons, having again bought some 2000 tons on change at 4.95¢ and 4.97½¢ September and October. Latterly, it is thought, the speculative holders have evinced some weakness. In St. Louis and Chicago the price is 4.70¢ October. A leading Cologne (Prussia) paper asserts, under date September 3, that the obstacles that stood in the way of getting the Spanish Lead mines to join the convention have been happily removed; as this is, however, not confirmed from other important sources thus far, it will be safer to await further developments. Soft Spanish rose in London from £13 15/ to £14. On change 32,500 lb October Lead fetched 4.97½¢.

Spelter.—The market in New York has been dull, because there is no stock, but in Pittsburgh 5½¢ has been paid for Common Domestic, which would be equal to 5½¢ here. It is expected that the next sale effected in this city will be at 5½¢. Blende is now paid \$30 per ton at the West. Silesian also improved still further in London to £18.15/, which would be equal to 5.85¢ laid down in New York, the nominal quotation for good brands at New York is 5.85¢ @ 5.87½¢.

Antimony.—Has been quiet but steady at 10¢ Hallett and 12½ @ 13¢ Cookson.

New York Metal Exchange.

The following sales are reported:

THURSDAY, September 13.

164 tons Lead, September.	4.97½¢
144 tons Lead, September.	4.95 ¢
48 tons Lead, September.	4.92½¢
16 tons Lead, October.	4.95 ¢
16 tons Lead, spot.	4.96 ¢
40 tons Tin, spot.	22.75 ¢
50 tons Tin, October.	22.30 ¢
10 tons Tin, October.	22.30 ¢

FRIDAY, September 14.	
116 tons Lead, October.	4.97½¢
128 tons Lead, October.	4.95 ¢
SATURDAY, September 15.	
100 tons Lead, October.	4.97½¢
48 tons Lead, October.	4.95 ¢
MONDAY, September 17.	
1156 tons Lead, October.	4.95 ¢
164 tons Lead, October.	4.97½¢
16 tons Lead, October.	4.92½¢
16 tons Spelter, October.	4.95 ¢
TUESDAY, September 18.	
48 tons Lead, October.	4.97½¢
WEDNESDAY, September 19.	
16 tons Lead, October.	4.97½¢
100 tons Lead, October.	4.95 ¢

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]
LONDON, WEDNESDAY, Sept. 19, 1888.

The course of the market during the past week and the plan of action followed by the parties who have been most conspicuous in the trading strengthen the previous belief that block Tin is virtually controlled by French operators. Just who the principals are is a matter of conjecture, so cleverly are their tracks covered; but the impression obtains that operators interested in Copper take more than passing interest in the Tin speculation. The irregular movement of prices, with sharp advances immediately after evidences of "short" selling, strengthen that belief in no small degree, and speculators and consumers alike seem to consider that a further rise is more than probable.

Chili Bar prompts have reacted sharply, owing in a great measure to settlements having been made privately by operators who had deliveries to make on contracts expiring this month. The highest price paid was £106. From that point a reaction to £90 took place, followed subsequently by a rise of £3, futures meanwhile remaining almost stationary. It is stated that the squeeze was carried through for the purpose of effectually putting a check upon outside "bear" operations, and also that, while the latter have lost heavily, the purchases necessary to force prices up have cut the net profit on the movement down to a comparatively small sum. It is estimated that the "short" interest on which deliveries fell due this month aggregated 10,000 tons, a great portion of which was covered early in the month. It is also calculated that the deliveries due on contracts expiring next month involve the greater portion of 15,000 tons. The French operators have figured to no remarkable extent in the trading the past week, and it is believed that it is their object to force private settlements of the "short" sales on which deliveries are due next month.

The statement comes from a presumably well informed source that the Société des Métaux is well satisfied with the financial results of their operations between producers and consumers, and that existing contracts will be renewed for a further period of three years, providing the mining companies are agreeable.

Copper furnace material continues very firm, but the transactions that can be traced out suggest very cautious buying by consumers. Among sales the past fortnight, Messrs. James Lewis & Sons' circular notes 200 tons Anaconda Matte at 15/ per unit, at Liverpool.

Tin Plates have been more active this week than last. The market is unmistak-

ably strong, but prices are somewhat irregular, both makers and buyers being influenced to greater or less extent by the course of the market for Block Tin.

The Treforest Works management are doubling their output and erecting a new mill. They now have seven mills in active operation.

The iron "warrant" market has received no small degree of support from outside speculative buying orders, the latter being encouraged by reports of continued active home demand and more or less extensive orders from America. Makers' brands of Scotch are again higher, as are also Middlesboro' and Bessemer products, the demand for which continues active.

In Manufactured Iron there continues to be a brisk business at firm prices, and most of the Steel branches are showing increased activity. Prices are higher on Rails, Blooms, Billets and Slabs, but unchanged on Wire Rods. Spiegeleisen is firmer and more active.

The failure is announced of Bennet Brothers, Liverpool, with liabilities of £25,000.

Scotch Pig.—The market has continued active and strong, with prices 6d to 2/ higher.

No. 1 Coltness, f.o.b. Glasgow	51/
No. 1 Summerlee, " "	53/
No. 1 Gartsherrie, " "	48/
No. 1 Langloan, " "	50/
No. 1 Carnbroe, " "	44/
No. 1 Shotts, " at Leith	49/
No. 1 Glengarnock, " Ardrossan	47/
No. 1 Dalmellington, " "	43/6
No. 1 Eglinton, " "	42/6
Steamer freights, Glasgow to New York, 10/	
Liverpool to New York, 10/	

Cleveland Pig.—There is still a brisk trade and the market retains a strong tone. No. 1 Middlesboro', G.M.B., 37/6; No. 3 do., 35/3.

Bessemer Pig.—Business has been on a large scale and prices are again higher. West Coast brands, mixed numbers, 46/ f.o.b. shipping point.

Spiegeleisen.—Demand is more active, and the market firmer. English 20 % quoted 77/6, f.o.b. N. W. England shipping point.

Steel Rails.—There is a brisk demand, and prices are higher at all points. Standard sections quoted at £4. 2/6, f.o.b. at N. W. England shipping point.

Steel Blooms.—In these there is a fairly active business, with prices firm and higher. We quote £4 for 7 x 7, f.o.b. at N. W. England shipping point.

Steel Billets.—Transactions have been on a large scale, and the market is strong. Bessemer, 2½ x 2½ inch, £4. 1/3, f.o.b. at N. W. England shipping point.

Steel Wire Rods.—The market remains quiet and unchanged. Mild Steel No. 6 quoted at £5. 18/9 and No. 5 at £5. 17/6, f.o.b. at N. W. England shipping point.

Steel Slabs.—Only a moderate trade, but prices very firm. Bessemer, £4, f.o.b. at N. W. England shipping point.

Old Rails.—Not much demand, but holders very firm. Tees quoted at £2. 17/6, and Double Heads £3, f.o.b.

Scrap Iron.—There is a moderate business at steady prices. Heavy Wrought quoted at £2. 7/6 @ £2. 10/, f.o.b.

Crop Ends.—Demand moderate, and prices unchanged. Bessemer quoted £2. 7/6 @ £2. 10/, f.o.b.

Tin Plate.—Business is of liberal volume, and the market strong. We quote, f.o.b. Liverpool:

IC Charcoal, Allaway grade	15/3 @ 15/9
IC Bessemer steel, Coke finish	13/9 @ 14/
IC Siemens " "	14/ @ 14/3
IC Coke, B. V. grade	13/6 @ 13/9
Charcoal Terne, Dean grade	13/ @ 13/6

Manufactured Iron.—There is an active trade all through and prices are strong. We quote, f.o.b. Liverpool:

Staff. Ord. Marked Bars	£ s. d.	£ s. d.
Common	@ 7 12 6	@ 5 0 0
Bl'k Sheet, singles	@ 7 0 0	@ 7 0 0
Velsh Bars (f.o.b. Wales)	@ 4 17 6	

Tin.—The market rather quieter. Straits quoted at £103. 10/, spot, and £104 for three months' futures.

Copper.—Spot market very irregular, futures steady. Chili Bars, £90. 5/, spot, and £78. 10/ three months' futures. Best Selected, £79.

Lead.—Market very slow and rather weak. Soft Spanish, £13. 15/.

Spelter.—There is still a good demand, and prices are firm. Silesian, ordinary, £18. 15/.

The decline of steamboating on the Upper Mississippi River, the Missouri and their tributaries is so rapid that navigation within a few years will be wholly abandoned in the Mississippi above its confluence with the Ohio, save by barges and the lumbering traffic. Within about 20 years the wharves at St. Louis were jammed with steamers doing a prosperous trade, whereas to-day scarcely half a dozen in actual business can be seen along the entire river front. The low rates for merchandise and the fast time made by railroads have destroyed all competition. Among the southbound boats the Tennessee River trade has suffered in the general decline. Even the barge line to New Orleans, which brought to the interior heavy importations of foreign goods, has not half the traffic that it enjoyed a year ago, and warehouses on the river are being converted to other uses.

The new shops for the Canadian Pacific Railway, now being built at Montreal, include a passenger car shop, 400 feet in diameter and two stories high; a wood machinery shop, 400 x 100 feet, also two stories high; a blacksmiths' and machine shop, 300 x 100 feet; a storeroom, 350 x 90 feet, two stories high, and a foundry, 150 x 100 feet. The buildings are of brick and stone and estimated to cost \$300,000.

A large electric light and power installation is about to be erected at Toulouse. The requisite power will in the first place be derived from water motors, the site of which is in the center of the town. The fall available will furnish 2000 horsepower.

Tacoma, the future city of the Puget Sound country, is remarkable for its steady growth. The permanent character of its buildings and improvements of all kinds impresses a stranger with an idea of its great future. With one of the finest harbors on the entire coast, the cheapness and celerity with which cargoes are handled make it of great attraction to foreigners. The largest vessel may lie along the docks, and discharge its cargo at a minimum cost. The lumber interest of Puget Sound is growing rapidly. Vessels are constantly loading at its docks for South America, China, Australia and California. As the waters are always still no difficulty is experienced in transporting logs in rafts to any point that may be desired. In one day at Tacoma 14 ocean sailing vessels and 23 steamers were registered. The

Northern Pacific has opened up a vast area of country, and it is promoting the interest and welfare of the people along the line across the continent. Vancouver, the terminus of the Northern Pacific Railroad, is actively competing for the tea trade with Japan. The Canadian Pacific steamer Parthia, from Vancouver August 1, made the shortest outward run on record between the Pacific coast and Japan, being but a few hours over 13 days. The silk and tea ex-Abyssinia, from Yokohama, at Vancouver, were delivered at New York in 10 and 14 days respectively. The Aberdeen, at Vancouver, 15 days from Yokohama, delivered its silk in New York in 9 days, and teas in 13 days from the Pacific coast.

Artificial Irrigation.

Artificial irrigation is recovering for agricultural purposes a large expanse of arid territory in Arizona and New Mexico heretofore regarded as worthless, and capital in large amounts is finding profitable investment in irrigation enterprises. The valleys of the Salt and the Gila Rivers have at least 2,000,000 acres of land that can be readily irrigated, and with the adoption of new systems of distribution and of storing and economizing water it is probable that that area can be at least doubled. The methods at present in vogue are wasteful, for the supply is so abundant that there is little need of economizing it. The work of developing the supply is going on rapidly, but nowhere near the extent, it is evident, to which it will soon be taken in hand. At present there are in the valley of the Solado something like eight main canals, having an aggregate length of 160 miles, and built at a cost of something like \$1,000,000. These have a capacity of irrigating something like 200,000 acres under the present system, but their irrigating capability could be much increased by the exercise of due economy. The Arizona canal is the chief of these enterprises. It has a length of 41 miles, and 120,000 acres of land will be ultimately tributary to it when all is brought under cultivation. In most of these canals the ownership is in what is called "water-rights." The canal is built by a company, each member of which has so many rights, according to the amount of his investment. A water-right entitles the possessor to the use of a given quantity of water from the canal. In most cases it is the constant use of 100 inches, which is considered sufficient to irrigate a quarter-section or 160 acres. Instances are mentioned where a single company have received as much as \$1,000,000 from the sale of water-rights, besides an income from the tolls. Both Arizona and New Mexico are exceptionally favored in having a large proportion of their area composed of a conjunction of mountain groups with broad plain-like valleys. It is believed that enough of these valleys will be found to be irrigable by damming up the beds of torrents at the feet of the mountains to make both Arizona and New Mexico two of the richest agricultural States in the Union.

A valuable relic of the Kearsage is preserved at the Mare Island Navy Yard—namely, the figure-head of the famous vessel erected on a handsome pedestal. An inclosure has been formed with dismounted cannon and chains, and on this is a flagstaff, from which floats the stars and stripes. The *American Army and Navy Journal* says this is guarded by mounted fieldpieces and close beside it stands the figure-head.

It is reported from Paris that the French Government will probably remove the import duty from cereals, on account of inadequate harvests.

Hardware.

Trade continues in a satisfactory condition, with a steady demand embracing general assortments of miscellaneous Hardware, with a good share of seasonable goods. Prices generally are without important change, the tone of the market continuing moderately firm, a few lines showing a tendency to stiffen, while others are without change, or, in a few instances, slightly weaker. Manufacturers are generally well supplied with orders, and, in some instances, are on this account less desirous of selling goods and are withdrawing some of their extreme quotations.

Cut Nails.

A very fair volume of trade is being done and most of the Eastern mills are running full. Stocks are comparatively light. Though there has been no quotable advance in the price of Nails the general improvement in the Iron trade has a favorable influence and tends to keep current quotations firm. We continue to quote \$1.85 to \$1.90 for carload lots on dock. We are advised by telegraph that a special meeting of the Western Cut Nail manufacturers was held at Pittsburgh Tuesday the 18th inst., with a fair attendance, 18 firms being represented. A pooling plan was submitted, but no action was taken on it. The \$2 card was reaffirmed. It was reported that the demand for Nails had slightly improved.

Wire Nails.

Manufacturers are reported to be adhering to the new prices, thus giving the market a firm tone. Some Nails purchased prior to the advance are, however, offered by holders at a slight concession.

Barb Wire.

In pursuance of a call issued by the Executive Committee, appointed at a previous meeting, a meeting of the manufacturers of Barb Wire was held in the Tremont House, Chicago, on Wednesday, the 12th inst., at 2 p. m. Upward of 20 were present, representing some 120,000 tons of the 150,000 tons estimated annual production. The meeting was one of the most harmonious in the history of the organization. Full reports were given by Mr. Washburn, of the Washburn & Moen Mfg. Company, as to the present status of the litigation against the manufacturers of unlicensed Barb Wire. It was freely conceded that the prices at which Barb Wire is now being sold are very unremunerative. The discussion which followed resulted in the unanimous adoption of a plan which, it is confidently anticipated, will result, when carried out, in placing the business on a very satisfactory basis. It was expected that another meeting would be called within 10 days, during which interval it would be possible to hear from every manufacturer in the country, and if the co-operation of all who were not present at this meeting was obtained, the result aimed at would be accomplished. H. B. Cragin, of the Washburn & Moen Mfg. Company, was chairman of the meeting, and G. W. Henry, of Joliet, was secretary.

There is little change in the condition of the market in this city, the price of 4 cents for carload lots being almost entirely nominal and shaded freely. The demand, however, is quite limited, though the outlook for the trade of the coming season is regarded as satisfactory.

Miscellaneous Prices.

There is a reaction from the extremely demoralized prices which have prevailed in Wrought-Iron Pipe. For different rea-

sons some of the mills have withdrawn from the market and a more conservative disposition prevails among those who are still in the field. As a result prices are somewhat firmer than heretofore, and there is a pretty general agreement on advanced prices, such as the following:

	Discount per cent.
1 1/4-inch and smaller Black Pipe.....	55
1 1/2-inch and larger Black Pipe.....	65
1 1/4-inch and smaller Galvanized Pipe.....	47 1/2
1 1/2-inch and larger Galvanized Pipe.....	55
1 1/4-inch and smaller Tarred Pipe.....	55
1 1/2-inch and larger Tarred Pipe.....	65
Well Casing, all sizes.....	60
Lap-Welded Charcoal Iron Tubes.....	65
Lap-Welded Steel Boiler Tubes.....	60

When the Screw manufacturers agreed in 1886 to discontinue their ruthless slaughtering of prices, and adopted measures calculated to secure greater steadiness in the trade, one of the most prominent and experienced of their number predicted that it would be two years before the real influence of their action would be felt. He reasoned from his knowledge of stocks in the hands of jobbers and from his understanding as to contracts for Screws which were yet to be filled. His prediction was borne out by the fact that for a long time prices continued weak, notwithstanding the undoubted good faith which the manufacturers kept with one another. Their discount to jobbers was 70, 10 and 5, but the jobbers were able to beat this price in numerous transactions, and to capture trade which should, from its magnitude, have gone to the manufacturers. One large transaction is known to have been made in the West in the past year at 80 and 2 1/2, by a jobber, notwithstanding the steady maintenance of manufacturers' prices at 70, 10 and 5. The verification of the prediction now seems to have occurred. Since July the price of Screws has been hardening, and manufacturers have at last secured control of the market. Jobbers who once were able to secure an extra 10 or an extra 5 without difficulty find themselves confronted with the necessity of paying the regular price for such stock as they need. They ask for 5 per cent., and even express a willingness to take 2 1/2 per cent. if they can get no more, but as far as can be learned the manufacturers are generally firm in their fixed rates. The bareness of stock in second hands is shown by the increased inquiries now being received by manufacturers and by the larger sales which they are now making. The opinion is freely expressed that manufacturers could easily put up their prices to 65 per cent. discount if they felt so disposed, as their organization is understood to be a strong one. But in view of the impression which prevails in the trade, that the goods are already very high, and the dissatisfaction with which an advance would be received, the companies have simply maintained their old prices.

The market for Steel and Wire Goods remains as at our last report—in excellent condition—and with a good prospect for the coming season. The understanding reached by the manufacturers seems to be working satisfactorily, and, as far as present indications go, the prospect for its continuance during the coming year is good. It is to be noted, while there has been no change in the discounts on Steel Goods, that in view of the recent advance in the price of Steel the ruling prices on these goods are lower, comparatively, than last year. The discount on the goods is, in fact, the same as it was when stock cost nearly 20 per cent. less than at present, and, on this account, it would not surprise the trade if an advance in price were made.

Jersey City Smelting Works, Jersey City, N. J., in view of the advances in Metals, announce, under date September 12, the following advanced prices for their standard grades of Babbitt Metals. The

terms are, on orders of 500 pounds or over, 60 days' acceptance, or 1 1/2 per cent. discount for cash in ten days; less than that amount, 30 days, net, f.o.b. Jersey City or New York City:

	Per pound.
Star.....	5 1/2 cents.
No. 4.....	9 1/2 cents.
No. 2A.....	13 1/2 cents.
A.....	21 1/2 cents.
Diamond.....	23 1/2 cents.
Star and Crescent.....	8 cents.
No. 3.....	11 1/2 cents.
No. 1A.....	16 1/2 cents.
Genuine.....	21 1/2 cents.
Extra No. 1.....	24 cents.

The Penn Hardware Company, Reading, Pa., are making the Penn Apple Parer, Corer and Slicer, and the Perfection Apple Parer, Corer and Slicer, on which they quote to the general trade \$4 per dozen.

E. C. Meacham Arms Company, St. Louis, Mo., have recently issued a postal, in which they offer special low prices on some lines of Ammunition unsaleable in that market, and make also quotations on other goods.

The Nubian Iron Enamel Company, Chicago, Ill., issue a small pamphlet devoted to a description of their Iron Enamel, giving a number of testimonials in regard to its merits, among which we observe letters from a number of well-known Hardware houses. Their quotations are as follows:

Bonnell's Nubian Iron Enamel, per dozen.....	\$2.00
Bonnell's Liquid Stove Polish, per gross.....	8.00
Bonnell's Benzine Stove Polish, per gross.....	6.00
Bonnell's Benzine Stove Paste Polish, in 5-pound pails, per pound.....	.13
Bonnell's Water Paste Stove Polish, per pound.....	.13

The following are the discounts of L. S. Starrett, Athol, Mass., on the line of fine Mechanics' Tools of which he is the manufacturer:

	Discount.
Spring Calipers and Dividers.....	25&10&10
Squares.....	25&10
Protractors.....	25&10
Rules and Straight Edges, Steel....	25&10
Lock Joint Calipers and Dividers...	25&10
Combination Dividers.....	25&10
Trammel Points.....	25&10
Surface Gauges.....	25&10
Screw Pitch Gauges.....	25&10
Micrometer Caliper Squares.....	25
Universal Bevel Protractors.....	25
Center Gauges.....	25&10
Scratch Gauges, Steel.....	25&10

Bright Wire Goods are in an exceedingly demoralized condition, and are probably now selling at lower prices than have ever heretofore prevailed. The competition between the manufacturers is active, and nearly all of them unite in making the low prices.

The prices of Chain show a tendency toward slightly higher quotations, which takes the form rather of a withdrawal of exceptional prices than the announcement of new prices. This remark applies to both Fancy and Coil Chains.

The Wire market is firmer than it has been, and a slight advance in price has in some cases been made.

The slight advance recently made in the price of Common Carriage Bolts, by which the discount was made 75 and 2 1/2 per cent. instead of 75 and 5 per cent. as heretofore, with the usual cash discount of 2 per cent., is reported to be generally adhered to.

The situation in Ammunition remains unchanged. A great many goods are being marketed, the trade, however, buying only for their immediate wants, recognizing that the present condition of the market is somewhat unsettled and feeling uncertain as to what further developments may be. The houses which are not in contract with the association, and are selling goods at irregular prices, are understood to have little difficulty in obtaining

Cartridges, and the effect of the irregular quotations which they are making is something of an obstacle in the way of the business of the houses which are maintaining the prices of the association.

Under date September 23, owing to an advance in the price of Lead, the following revised quotations on Shot were announced, there being the usual discount of 2 cents per 25-pound bag if paid within five days from receipt of bill:

Drop Shot, per 25-pound bag.....	\$1.45
Drop Shot, per 5-pound bag.....	.34
Buck and Chilled, per 25-pound bag.....	1.70
Buck and Chilled, per 5-pound bag.....	.39

Trade.

The following report of the Louisville market, which comes under date September 15, will be of interest:

The Hardware trade of Louisville, Ky., continues good, showing no diminution in quantities of goods going out. Prices hold their own well. Manufacturers seem to study the requirements of the jobbers and cater to their wants more than ever, recognizing in them the best distributors of their products. Except in a few unlooked-for advances, particularly on goods that were selling at losses, some factories prepared the dealers for higher prices, allowing them time to secure a limited stock. This is appreciated by the jobbers, who remember the action in their future orders. It also gives them confidence and an opportunity to realize a moderate profit on their purchases. Bar and Sheet Irons are rather scant in stock, as the demand from store is good and the mills rather slow in filling orders, many being oversold, particularly on Sheets.

Wire Nails are firmly held, most mills having full contracts, and the good specifications going in show that their place in the trade is being enlarged. Cut Nails have also held firm, with one pointed exception. Dealers apprehend another advance at the meeting on the 18th, but are afraid to further increase their holdings. They also apprehend that at a moment's notice the pool will be sprung on them. Many favor this plan, while others deprecate it, preferring an open market and running the risk of cut-throat prices, other than have a given profit allotted them. Barbed Wire has been a speculative feature during the week. Some mills that were well secured on orders withdrew the lowest prices, which caused an agreeable movement to those mills who were willing to take a few cars more. They have all ordered an advance and will probably hold to it, and at an early day the nominal association will probably be fixed up. This staple article has had an unprecedented run this season, owing to both low prices and increased consumption. Plain Wire is still low, with prospect of early advances.

There never was such a large trade in Agricultural Machinery and Implements, particularly Grain Drills, which, together with the enormous amount of fertilizers going into the country, show that the present good crops only stimulate the farmers to plant more heavily for next season. The large fruit crop causes an extraordinary rush on dealers and manufacturers for machinery to grind and press it into marketable shapes. The yellow fever scourge, in Florida, is badly affecting trade in the lower cotton States reached by Louisville jobbing houses, causing utter stagnation in certain localities that are panicky. Otherwise the general trade has improved over last week. The city is still crowded with visitors, brought here by the attractions of the fall celebration, which are interestingly managed. During the week magnificent fruit and flower displays were carried on and one night a splendid flambeau parade literally filled the city to overflowing. All of the principal streets are still decorated by day and illuminated by night, arches of colored lights spanning every street crossing.

The Wells & Nellegar Company, 72-76 Lake street, Chicago, have issued an illustrated Wholesale Price Current of Cutlery, Sporting Goods and General Hardware, under date of the 11th inst. In their review of the markets on the first page they say:

Hardware.—The demand for Hardware during the recent summer months has been larger than ever before, and orders have been for general assortment goods, showing conclusively that stocks throughout the West are light, and that the large harvest already assured has stimulated trade to such an extent that the universal cry will be of a scarcity of goods, as we are already experiencing difficulty in getting our orders filled with some lines of goods as fast as the trade wants them. We

are candid in our opinion that firm and higher prices are sure to follow.

For a time we attributed our largely increasing trade to the many customers who came to us about the time of our purchase of the Keith, Benham & Dezenendorf stock, but as there seems to be no let-up to our growing trade, we cannot but feel that the demands of the country are growing correspondingly.

Nails.—Steel Cut Nails are very firm at an advance price of 15c. which occurred on the 30th. Wire Nails have also advanced 20c. per keg, and we expect both Cut and Wire Nails will be still higher.

Sheet Iron is also higher owing to advances in raw material, which is having its effect upon other lines of goods. Sheet Iron, besides being \$4 per ton higher, is very difficult to obtain from the mills, and we suggest to all customers to cover their wants on all heavy goods without further delay.

The circular consists of 16 large pages, covering a variety of goods.

Items.

Boston and Lockport Block Company, Lockport, N. Y., have been increasing their facilities for the manufacture of Snow Shovels and have also added two new styles to their line, the Star and the Eclipse. Their announcement relating to these goods will be observed on page 33.

The Ludlow-Saylor Wire Company, St. Louis, Mo., have taken the agency for the Hartman Patent Picket Fence, which is referred to as having a large sale.

The display made by the Kelly Axe Mfg. Company was a conspicuous feature of the industrial parade at Louisville, Ky., on the 5th inst. A float supported an Axe 20 feet high, which shone like silver, and was followed by a company of 250 employees, all dressed in a neat uniform, and each bearing on his shoulder a brand new Axe, glistening in the rays of the sun.

The Rector & Wilhelmy Company, Omaha, Neb., issue a price current devoted to seasonable goods, including Stove Boards, Elbows, Coal Hods, Fire Arms, Huskers, Meat Choppers, Lanterns, Apple Parers, Axes and many other goods. Quotations are given in cipher, to which a key is furnished.

Butts & Ordway, 145 and 147 Pearl street, Boston, Mass., in their price list, No. 1, represent a line of Nuts, Washers, Screws, Drills, &c. The pamphlet is illustrated and clearly printed, and will be appreciated by the trade as giving the standard lists in convenient form.

On page 75 is the advertisement of Frost's Anti-Rattler. At a glance it will be seen what a wide range its sale has in the United States, and in addition we are advised that they are exported to New Brunswick, Canada, England, Australia and New Zealand. Their popularity is also referred to as constantly increasing.

Hibbard, Spencer, Bartlett & Co., of Chicago, and Simmons Hardware Company, of St. Louis, have each issued very complete catalogues of Rochester lamps. Illustrations and price lists of the various styles are given, embracing parlor, study, fount, piano, bouquet, mammoth, wall and stand lamps. These illustrations not only convey an excellent idea of the different kinds of Lamps belonging to this line, but they also show the artistic finish which embellishes the finer grades.

Hibbard, Spencer, Bartlett & Co., Chicago, have issued another catalogue this month, covering a great variety of seasonable goods, including Tin Plates, Sheet Iron, Metals, Stove Boards, Elbows, Coal Hods, Stove Shovels, Fire Irons and Stands, Stove-Cover Lifters, Coal Vases, Husking Pins, Meat Choppers, Grain Scoops, &c.

The Central Expanded Metal Company, 116 Water street, Pittsburgh, Pa., have issued an attractive pamphlet which is de-

voted to an exposition of their manufactures under the patents of J. F. Golding. It represents a line of Steel Lathing and Netting for fences, gates, window and skylight guards, elevator shafts, &c. Our readers will remember that in a recent issue we gave a description of this new line of goods, and the pamphlet in hand illustrates the uses to which the principle is applied. A number of full-size illustrations are given, showing the different meshes in which the Expanded Metal is furnished, with other illustrations showing in detail the manufactured articles in which it is used. The pamphlet is fully illustrated and gives information in regard to the process of manufacture and the advantages possessed by the product, which will be of interest to many in the trade.

The Schreiber & Conchar Mfg. Company, Dubuque, Iowa, issue a circular which they designate The Silent Traveler, in which they illustrate their Barn Door Hangers, Cylinder Heads, Registers and other goods of their manufacture.

The Winona Wagon Company, Winona, Minn., issue an attractive colored circular relating especially to the Rushford Wagon, calling attention also to their line of Farm and Spring Wagons, Drays, &c.

The Iowa Farming Tool Company, Fort Madison, Iowa, are at present at work on their annual catalogue, and it is expected that it will soon be issued.

A. H. Fisher, representing the Coburn Trolley Track Mfg. Company, Holyoke, Mass., manufacturers of a new Movable Ladder for stores, has opened an office at 131 Duane street, New York.

Haydock & Bissell announce, September 25, 26 and 27, a large sale of Table and Pocket Cutlery, Carvers, Butcher Knives, Plated Flatware, Shears and Scissors, &c., at 12 Murray street, New York. Particulars are given in their advertisement on page 51.

Chas. Elterich, 193 Worth street, New York, announces that hereafter all the goods manufactured and sold by him of his design, invention and patent will bear this trade-mark:



which has been registered, and will be duly stamped on such goods, and where space permits "Elterich" or "C. E." will also be stamped in connection with the trade-mark. The line of goods to which this announcement refers are Taps, Dies, Tap Wrenches, Die Holders, Cutters, &c.

Obituary.

The Sweet & Clark Mfg. Company, Troy, N. Y., make an appropriate announcement of the death of Miles Sweet, who was held in high esteem for his personal worth and the qualities which command the respect of those who knew him. The company announce his death in the following terms:

It is with regret, in which we trust you will share, that we have to announce the death of the senior partner of this firm, Mr. Miles Sweet. Mr. Sweet died this day at his home in this city, aged 61 years. The sincere sorrow of all who knew him proves his worth as a man, and more fitly testifies than can any words of ours to the great esteem in which he was held.

Trade Topics.

We have received the following communication from a Hardware house in this State. It relates, it will be observed, to the condition of things in the Stove trade and the difficulties which dealers in some sections are encountering:

The time has come for dealers to be looking after their Stoves for the fall trade. The subject is attended with a good degree of concern, inasmuch as competition on Stoves is going beyond all reason.

Consumers as a rule, maintain with zeal that Stoves, both for wood and coal, are decidedly

too high—that manufacturers are in a combination, and are holding prices to suit themselves, which means a greater profit than the times justify. With these views many only propose to buy when forced to by sheer necessity; and then not till they have canvassed the county they live in for the very best price. Now comes the most annoying experience a man can have in business. Some Stove manufacturers will sell their Stoves to a general agent, granting him large territories to wholesale and retail their goods in. The result is, said agent opens a retail store at one's county seat, and, sly as the nephew of Satan, tampers with all he meets there, filling them with prices, and styling himself "the Stove king," who can undersell all others, because he gets his at the general agent's prices, which are way below what an ordinary dealer has to pay. If the customer does not warm up and begin to buzz at once, he says, "Strange enough, sir, that I cannot do better than your merchant at home, when, in fact, I sell him all the goods he handles in our line; and now, sir, as a special inducement to you to buy of me, if you will come here and select a Stove or Range you can have the same terms he gets, provided only you will not give me away to him. Of course this is a special, confidential offer to you; but if any of your friends want a Stove you just send them over to me."

It is wonderful how haughty this man will be when he meets his home merchant, perhaps the next day. He will look about the Stove room and make elaborate inquiries how such a Stove works, but when urged to buy he remarks: "I can buy that Stove as cheaply as you can, and cheaper than you can afford to, for I can go and get it myself, and you have to pay the freight on yours." The dealer has no more to say if he knows the man is truthful and honest, but very naturally prays that he will have to do business with his general agent in heaven. This condition of things has annoyed retail Stove dealers about long enough, and it is about time they sought out some scheme to operate in self defense. The only remedy the writer can offer at present is for merchants to refuse, in a body, to handle such Stoves, directly from the makers or indirectly through such an agency, until the above complained of nuisance is abated. It is time this subject was discussed and agitated, for the evil is growing apace, and in certain localities threatens to ruin the Stove trade. It is suggested and hoped that some one who has experienced the same evil will consider the matter more fully for the benefit of the readers of *The Iron Age*. Let us hear from others and have a proposition suggested to be put in force in the near future.

Exports to New South Wales.

The increasing trade which American manufacturers are having with New South Wales is indicated in the following abstract, which shows some of the leading goods in Hardware and related lines which were taken to that market in a single vessel:

PER BRIG PATRICIAN, AUGUST 21, FOR SIDNEY, N. S. W.

By *W. H. Crossman & Bro.*—15 boxes Carpenters' Tools, 1 gross Traps, 1 case Hardware, 2 cases Carpenters' Tools, 22 Guns, 1 case Tools, 50,000 Primers, 50,000 Cartridges, 3 dozen Molds, 6 dozen Brooms, 1 case Hardware, 39 Lawn Mowers, 18 dozen Lanterns, 4 cases Sad Irons, 50 cases Scales, 1 case Toys, 31 Velocipedes, 1 case Stove Parts, 3 sets Tools, 3 dozen Braces, 3 dozen Scales, 1 package Hardware, $\frac{1}{2}$ gross Lemon Squeezers, 24 dozen Traps, 1 case Hardware, 6 dozen Mattocks, 1 case Hardware, 3 dozen Traps, 3 gross Grease, 4 dozen Scales, 4 cases Hardware, 11 dozen Cages, 2 cases Hardware, 1 case Carpenters' Tools, 12 dozen Bench Screws, 20 gross Traps, 2 cases Harness, 475 feet Leather, 7 dozen Axes, 4 dozen Hatchets, 6 Revolvers, 150 shells, 13 cases Hardware, 1 gross Lemon Squeezers, 10 dozen braces, 33 Stoves, 2 dozen Wringers, 7 cases Carpenters' Tools, 100 dozen Shovels, 6 dozen Traps, 6 dozen Mattocks, 18 dozen Hammers, 5 dozen Axes, 2 Scales, 20 Guns, 33 sets Tools, 76 dozen Handles, 28 dozen Hatchets, 10 dozen Axes, 3 gross Traps, 1 case Hardware, 24 dozen Hatchets, 24 dozen Hammers, 5 cases Hardware, 6 dozen Picks, 1336 feet Leather, 1 case Hardware, 25 pounds Nails, 12 Rifles, 12 Sets Tools, 20,000 Primers, 10,000 Cartridges, 36 cases Scales, $\frac{5}{8}$ dozen clocks, 3 cases Hardware, 12 dozen Wrenches, 10 cases Carpenters' Tools, 96 dozen Traps.

By *J. A. Gifford*.—2 cases Harness, 1 case Handles.

By *H. W. Peabody & Co.*—59,896 pieces Slate, 450 pounds Fuse.

By *McLean Bros. & Rigg*.—1 gross Graters, 21 dozen Saws, 30 pairs Barn Door Rollers, 12 dozen Axes, 86 dozen Mouse Traps, 24 dozen Mouse Traps, 84 dozen Pulleys, 6 gross Coat and Hat Hooks, 36 dozen School Slates,

9 pairs Revolvers, 3 gross Chalk Lines, $\frac{3}{4}$ dozen Wrenches, 1 dozen Tills, 26 dozen Curry Combs.

By *Arnold Cheney & Co.*—1000 pounds Buggy, 3692 Buggy Parts.

By *F. B. Wheeler & Co.*—27 dozen Hardware, 17 cases Hardware, 10 gross Brushes, 25 dozen Lamps, 25 dozen Holders.

By *Nevius & Hariland*.—25 gross Shade Rollers, 20 gross Shade Rollers.

By *Winchester Repeating Arms Company*.—50,000 Shells, 71 pounds Metallic Cartridges, 50,000 Shells.

By *A. Field & Co.*—6 cases Rifles and Tools, 2 cases Plated Ware.

By *A. S. Lascelles & Co.*— $\frac{1}{2}$ dozen Plated Ware, 24 Hatchets, 30 dozen Axes, 20 cases Axes, 1 gross Razor Straps, 20 dozen Cutlery, $\frac{6}{8}$ dozen Hardware, 260 pounds Nails, 20 Firearms, 1 dozen Guns, 9 dozen Hardware, 2 gross Shovels.

By *V. Basanta*.—9 gross Toy Pistols, 3 dozen Wheelbarrows, 4 dozen Corn Shellers, 60 dozen Hammers, 95 dozen Handles, 2 dozen Wagon Jacks, 21 dozen Brushes, 1200 feet Hose, 4 dozen Guns, 6 dozen Loading Tools, 100,000 Primers, 16,000 Cartridges, 6 Guns, 40 dozen Shovels, 170 dozen School Slates, 2 dozen Clocks, 10,250 pounds Carriage Bolts, 3 dozen Wrenches, 5 dozen Pumps.

By *R. W. Forbes & Son*.—38 Clocks, 2 dozen Saws, 51 packages Carriages and Parts, 6 packages Hardware, 1 box Cider Mills, complete, 8 packages Hardware, 454 pounds Lining Nails, 24 dozen Axle Clips, 10 pounds Carriage Varnish, 1 box Stamped Tinware, $\frac{1}{2}$ dozen Miter Boxes, 1200 Leather Washers, $\frac{3}{4}$ dozen Sad Irons, $\frac{1}{4}$ dozen Locks, 122 bundles Rims.

By *Arkell & Douglas*.—7 Buggies, 6 Lawn Mowers, 236 pounds Tacks, 134 dozen Handles, 1 dozen Wringers, 6 Stoves, 2 gross Shade Rollers, 309 pounds Slates, 50 dozen Brooms, 24 dozen Handles, 4 dozen Churns, 12 dozen Paint Brushes, 16 dozen Axes, 25 dozen Axes, 80 dozen Shovels, 12 dozen Handles, 40 dozen Shovels, 32 dozen Axes, 32 Churns, 28 dozen Axes, 3 gross Traps, 13 dozen Paint Brushes, 24 dozen Hatchets, 12 dozen Hose, 3285 pounds Bolts, 732 dozen Handles, 30 dozen Shovels, $\frac{1}{2}$ gross Traps, 16 dozen Wire Goods, 9 dozen Saws, 20,000 Cartridges, 39 Wringers, 20 dozen Hatchets, 12 dozen Handles, 6 dozen Toys, 18 dozen Locks, 40 dozen Axes, 5 cases Carriage Hardware, 39 bundles Carriage Hardware, 100 dozen Shovels, 600 dozen Handles, 55 dozen Hatchets, 10 dozen Saws, 120 dozen Sewing Machines, 10 dozen Saws, 90 dozen Shovels, 1 Case Handles.

By *V. Basanta*.—15 dozen Lanterns, $\frac{1}{2}$ gross Hat Racks, $\frac{4}{5}$ gross Whisk Brooms, 96 dozen Lock Blanks.

By *Coombs, Crosby & Eddy*.—10 dozen Axes, 54 Stoves, 7 dozen Braces, 168 pounds Oil Stone, 15 dozen Hammers, 4 dozen Ladders, 62 Stoves, 16 dozen Door Springs, 26 dozen Hardware, 5 dozen Wrenches, 46 dozen Hardware, 11 dozen Edge Tools, 3 Churns, 1 dozen Clocks, 5 dozen Axes.

By *Itley, Doubleday & Co.*— $\frac{1}{4}$ gross Axle Grease, 3 dozen Paint Brushes, 112 pounds Glue, 3 gross Paint Brushes, 6720 pounds of Axle Grease, 336 pounds Glue, 25 gross Axle Grease, 12 cases Carriage Ware, $\frac{2}{3}$ dozen Iron Banks, 3016 feet Leather Belting, 55 dozen Toys, 10 dozen Roller Skates, 12 gross Glass Cutters.

By *R. W. Cameron & Co.*—10 dozen Axes, 60 cases Handles, 7 Carriages, 9650 pounds Machinery, 100 Lamps, 30 gross Polish, $\frac{12}{14}$ gross Axle Grease, 4808 pounds Nails, 35,000 Slate, 21,500 pounds Fruit Jars, 2000 pounds Buggies, 412 pounds Brushes, 14 packages Forges, 41 Barrows, 8150 pounds Woodworking Machinery, 4 cases Saddlery, 7 cases Hardware, 1 case Whips, 30 packages Hardware, 275 dozen Brooms, 1 box Pumps.

By *Singer Mfg. Company*.—173 cases Sewing Machines and Parts, 200 cases Sewing Machine Oil.

By *Strong & Trowbridge*.—1 case Hardware.

By *Welsh & Lea*.—22 cases Iron Bolts.

By *Ansonia Clock Company*.—85 boxes Clocks, 7 boxes Clocks.

By *Reed & Barton*.—42 packages Plated Ware.

By *Russell & Irwin Mfg. Co.*—7 cases Hardware.

By *J. A. Ten Eyck*.—4 cases Wagon Springs.

By *Parker & Whipple Co.*—12 cases Clocks, 2 boxes Clocks.

By *Goulds Mfg. Company*.—4 packages Pumps.

By *J. L. Mott Iron Works*.—37 Stoves.

By *Healy & Earl*.—1 box Emery Rollers, 2 boxes Saws.

By *Collins & Co.*—223 dozen Tools, 290 dozen Tools.

By *Crane & McMahon*.—22 cases Handles.

By *H. S. Chipman*.—1 case Hardware, 2 cases Handles.

By *McCoy & Sanders*.—2 racks Hand Spikes.

By *J. Dixon Crucible Company*.—1 case Lead Pencils, 3 packages Crucibles.

By *F. B. Wheeler & Co.*—1684 pounds Wire Cloth.

By *Waterbury Clock Company*.—25 cases Clocks.

By *R. W. Forbes & Son*.—13 Buggies, 4 cases Reloading Tools, 1 case Handles.

By *Strobel & Wilken Co.*—12 $\frac{1}{2}$ dozen Express Wagons, 42 dozen Toy Banks, 21 $\frac{1}{2}$ dozen Iron Toys, 8 dozen Toy Pianos, 27 $\frac{1}{2}$ dozen Pianos, 35 dozen Tinware.

A White Lead Swindler.

The Pittsburgh White Lead companies have been made the victims of a swindler, whose operations have extended over the past two years. He has succeeded in carrying on his operations in different parts of the country, and thus far has escaped detection and arrest. He goes, at times, at least, under the name of C. F. Randolph, and is described as being about 33 years of age, medium height, sandy complexion, gentlemanly appearance and good address. He has been operating recently among the Hardware dealers in Western Pennsylvania and New York State, and it is thought probable that he designs continuing to work among the Hardware dealers, as the paint houses have been pretty generally warned against him. Girard C. Smith, secretary of the Beyman-Bauman Lead Company, Pittsburgh, thus describes his method of operating:

The man who has been swindling us did not go to the houses that are doing business directly with ours. He is too sharp for that. If he did he would be detected at once. He visited houses that handle our goods, but which do not deal with us direct. His plan is to present his card from whatever house he chooses to select, make some slight concessions in price of his goods, with privilege of long time for payment, and thus secure an order. He then explains that he is in need of money, and produces a forged letter on printed note-head in imitation of the firm, instructing him to make draft if in need of money, and thus induce the dealer to cash the paper or identify him at the bank, in this way obtaining from \$25 to \$75 at a time, the dealer only learning that he was the victim of misplaced confidence upon the return of the draft protested several days afterward. Dealers then deem it too late to make any effort to pursue the rascal, and usually pocket the loss philosophically, at the same time mentally registering a vow to cash no more drafts or advance no money to traveling salesmen. When indorsement of draft is refused he contents himself with obtaining a loan of \$5 or \$10, to be returned in a few days on receipt of remittance from his house. It is probable that his operations are not limited to the White Lead interest, and that he is working other lines of business in the same way. It is estimated that he secures several thousand dollars yearly in this peculiar occupation. The cards presented by him are usually printed in gilt letters on black enameled background, and inscribed: "Manufacturers and corrodors of strictly pure white lead and linseed oil." The letter-heads being ordinary printed ones, this fact alone would excite the suspicion of the dealer, being of inferior character to that employed by any of the firms represented, who use lithograph or engraved work.

He devoted his attention for a long time to small paint dealers and painters, but perhaps owing to his being extensively advertised in the paint journals he seems to have neglected that branch latterly, and is now catering to the Hardware trade, all the dealers who report recent visits from him being engaged in that branch of business. If the trade would keep a vigilant watch for this impostor and adopt the simple precaution to quietly wire the firm when applied to in this way by traveling men whom they do not know personally, the fellow's career would soon be brought to a short turn.

Clerks.

BY KNARF.

As with other things, there are clerks and clerks. There is the clerk with bangs and middle-parted hair, with an odor of Hoyt's German Cologne hovering about him; wears tooth-pick shoes, and busies himself by wiping and rewiping the pocket cutlery samples, especially when the proprietor is about. He has numerous young lady friends, the smaller the town the more numerous they are, and the more frequent their calls on him. He is the leader of fashion among the boys; the originator and organizer of picnics, dances and sleigh rides, while he has not sense

enough to know that locks were once made right hand or left hand, not reversible; or that there was a time when points did not grow on wood screws. He may go far enough to reason that, in his mind, there would be as much propriety in naming a D. H. shovel a "D. H. dirt shovel," because it goes in dirt, as to call an iron or steel screw a "wood screw" because it goes in wood.

Then there is the clerk who finds visiting the neighboring grocery or drug store more necessary to his comfort than seeing that the nail bins are kept full. His name is apt to be "Will" and the query any hour in the day is "Where is Bill." He wears a light colored flannel shirt, prominent necktie, and dotes on being a strawberry blonde. The grocery candy case and drug store soda fountain receive complimentary calls from him daily.

The clerk that was born tired is a very common occurrence. He, as a class, is of no particular physique, so that (being forewarned would be forearmed), we cannot guard against him. He is generally of gentlemanly appearance, good address, and the first impressions received of him are favorable. He is apt to be somewhat particular in knowing just what work will be expected of him, also as to length of hours and engagement. But you reason with yourself that this should be nothing against him, as you would want to know the same things if you were hiring out. So the engagement is made, and the things expected of him remain so—undone to the end of the time you have promised to harbor him. He is full of excuses for his remissness, and in weariness of spirit you wish there were no such things as excuses. You are irritated at finding him occupying your desk and favorite gold pen upon your unexpected return to the store. You wonder how much soldiering he is capable of? He believes, and will reason with you, that there is no such thing as laziness, but that some organisms are born with an inherited lassitude, which is constitutional, and cannot be eradicated. Notwithstanding this chronic disability, he is captain of the "clerk nine" when they have a scrub game of baseball, on the hottest day in summer, with the Green Stockings.

The rarest type of clerk is the most desirable, as is the case with other desirable things in this life. He is steady going, but accomplishes much. Quick to see and willing to do what he sees needs doing; a pleasant word for each customer, and a faculty of holding a second customer until he has waited on the first, almost anticipating their wants, and generally selling them something more than they intended buying. You can leave him in charge of your business and feel assured it is not only well attended to, but honestly conducted; that none of the cash finds its way into other channels than the till. But this kind of a clerk you must needs advance his wages, or some one else will, until you find it to your advantage to give him an interest in your profits and losses, or he may anticipate your kindness and take a double interest, first by engaging the hand of your only daughter and then accepting a partnership in your business.

The clerk of 30 years ago, especially in the country towns, was typical; the species now is almost extinct. A strong, rugged farmer's boy, 15 or 16 years' of age, whose system is full of buckwheat and pork, carrying evidences of the same on his face, hanging his hat on the floor behind the door upon his first appearance at the family table. He is to board and room at his employer's home. The knife is the most convenient mode of transit for food, f.o.b., his mouth being the point of delivery. The partly masticated dinner goes down with a gulp. In a short time these evidences of being a rustic disappear, and

his natural adaptability to environments soon lead him to a more easy carriage and the polite courtesies that make up so large a part of home and business life. Being a member of the family, he was under the eye and care of his employer, which proved to be of untold advantage to him in after life. His associates were scrutinized, and he was expected to be at home after the store closed. His religious training was not neglected, and while his wages were small, perhaps \$25 to \$50 for the first year, for this first year he saved money. As a result after a service of five or six years the raw country boy leaves his employer with a well-formed character, thoroughly acquainted with the business, competent to take a prominent place in the world. This plan of educating a boy in business was subsequent to the prehistoric time of binding them out.

The modern clerk presents a different appearance. Too often, besides getting a knowledge of business in the day time, nights are employed in playing poker, drinking and frequenting places where he would be ashamed to have his best girl know he went. It is too common a course nowadays to need any portrayal here, but we know the end from the start. The roads to success and ruin are in diametrically opposite directions.

The Question of Credit.

A recent issue of the *American Storekeeper* contains some very valuable suggestions on the subject indicated by the above title, and as they appear applicable to all lines of trade we present them herewith for the benefit of our readers:

A universal reply to the question, "How is business?" has come to be, "Business is good, but collections are slow." This reply may be varied as concerns business, but collections seem to be chronically slow. Collections follow as one of the many troublesome sequences of granting credit, and granting credit seems to be with most merchants a necessary concomitant to business. The evils of credit are frequently set forth in our trade exchanges, and articles are often published describing successful methods of collecting bills. These vary from the shotgun policy to the soft-soap policy, but one thing stands out very plainly on them all: They are undignified, unbusiness-like, and, we believe, unnecessary. Merchants who are burdened with slow-paying customers universally regret that they have a credit system, and as universally declare it to be a necessary evil connected with merchandising. We are prepared to admit that credit is, in many cases, a necessary adjunct to a mercantile business, but we cannot admit that it need always be an evil. It simply lies within the merchant's power to make his credit customers a disappointing and profitless feature of his business, or a prompt, reliable class whose payments may be reasonably relied on. To a certain degree the necessity of expending commissions to collection agencies, whose effectiveness in many cases is due to their blackmailing schemes, must be very humiliating to a merchant. It is an evidence that he has placed confidence in unworthy persons, and that his judgment is not worthy to be relied upon. It is an evidence that he did not give that attention to the details of his business which would enable him to conduct it without giving his goods away. It is an evidence that the consumer was a little too sharp for the dealer.

We are well aware that some of our readers who have made bad debts will not thank us for taking this view of the case, but, if they will be patient, we will endeavor to show them that our position is correct. To do this we must consider for a moment what credit is. There should be no difficulty in understanding the nature of credit. It is a loan of saleable commodities without se-

curity. The merchant who trusts a man for a barrel of flour furnishes the man material on which to live while he earns money to pay for it, the flour being consumed when the payment is made. Credit thus permits us to wear out clothing before it is paid for, to consume groceries without having given anything for them, and—in other words—to eat our chickens before they are hatched. The merchants who grant credit place themselves in the position of philanthropic persons who enable their customers to live before they have earned the right to live. There are cases of deserving poor who are temporarily unable to pay for the means of sustaining life, but merchants who feel charitable should support such persons purely as a charity and not as a business policy.

Consider for a moment the position which you, as a storekeeper, occupy. You have invested your money in a stock of goods. If the goods have been paid for, they belong to you absolutely. They are to you the results of saving, thrift and economy. Those goods you can give away if you like, but you possess them because you believe that you can profitably exchange them for commodities you need. In this exchanging process money need not necessarily enter, as your goods could be directly bartered for other goods—as they frequently are for butter, eggs and produce—without any money passing between you and your customers. Money only enters as a convenient and reasonable equivalent for commodities, and your goods should purchase as much money as you originally exchanged for them, plus a sum which will recompense you for placing your services at the command of the public. By taking this view of the transaction, you will see that you might as well loan a man \$10 without security, note, or other evidence of debt, as to trust him for goods which you could exchange for \$10.

At the risk of being wearisome, let us impress this fact thoroughly on your mind. Colwell, a writer of great insight, thus contrasted the credit and cash systems: "Under the credit system no equivalent is given at the time of sale, the payment being postponed for a time definite or indefinite." "This is in direct contrast with the cash or money system, in which every article is either paid for in the precious metals (or their paper equivalents) at the time of delivery, or at some time afterward," the last phrase referring to purchasing of wholesalers, payment being made on receipt of bill. Credit is the general belief entertained of men that their action will correspond to their promises, and is based on the belief in the existence of money actually or prospectively in the possession of the person to whom credit is given.

Let us suppose now that the stock of goods in your store is not entirely paid for. You took what money you had saved and went to the wholesale dealer for your stock of goods, which you desired should equal twice, perhaps, the money you had saved. Did you simply select your goods, pay what money you had and order the balance charged to your account? Ah, no! we have no doubt you remember your interview with the credit man! Did you not have to unbosom yourself quite freely, and did not the firm find out your standing from the various commercial agencies before any goods were delivered? Certainly. You remember it well. Did you take it as an affront and an imputation on your honesty? Not at all. We dare say you furnished all the information asked for willingly, as you should have done, and that you have been careful to maintain your credit ever since.

Let us now come from generalities to particulars. On general principles we prefer a cash business. It is more speedy,

more profitable and less annoying, but we realize that a credit business is much preferred in some localities. Granting this much, we propose to take the ground that a merchant can do a credit business without loss, and without trouble and anxiety. In order to accomplish this, however, he must conduct his credit business as a bank loans money—with caution. As a rule, accounts are forced on a storekeeper. Few customers ever directly ask to open accounts. They send children after things with a lisped request to charge the goods. They ask you to make a slip until they come in again, or they buy more than they can pay for and ask you to "remember the balance." There are hundreds of ways to do it, but the merchant should present a bold front at the first attack. He should not refuse any person credit unless he is prepared to do a cash business, but upon the first application for credit he should have his would-be debtor understand distinctly what credit at his store involves.

Credit should largely rest on a knowledge of a man's financial history and condition. It should not be refused to a man who all his life has met every engagement, nor should it be extended to one who has regularly failed therein. Your own judgment of the man's character should not be relied upon to guide you in this matter, because there is a natural inclination in the human mind to magnify that which is not certain, and we are apt, therefore, to ascribe more means to a man than he really possesses. A merchant should be guided in granting credit to a person by: 1. The positive amount of capital possessed or the ability to earn wages. 2. The general fidelity displayed in past engagements. 3. The co-operation which the law will give in the collection of the account, if necessary to proceed to law. It is well to know the extent of protection the law throws around a debtor, because, as Charles Francis Adams has pointed out, "The first reliance of a creditor is commonly upon the good will of his debtor; the second upon the law of the land."

Recognizing that the person to whom credit is given is the one accommodated, and not the merchant, it is well to throw off this absurd fear of losing trade and of being obliging, &c., and maintain a stiff control of your credit. If a person tries to enforce credit on you, stop right there and have a plain talk with him, or, if easier, have your talk printed. It might be well to ask him if he wished to open an account, and to tell him, if he does, to make application in regular form, as do all your credit customers. On this form there should be a statement something like this:

"We endeavor to sell only the best goods and at the best prices. These prices are based upon a cash business. To conduct a credit business costs more and reduces reasonable profits, or increases the prices to cash-paying customers. Those who receive credit should be willing to pay interest on the amount of their purchases, and should willingly furnish information on which I can base an opinion as to their financial responsibility. I do not desire poor paying customers. If you are prepared to submit the following application for credit I shall be pleased to consider it.

JOHN JONES."

"APPLICATION FOR CREDIT."

"I desire to apply for credit for groceries to a sum not to exceed ten dollars a month. I agree to pay promptly on the first of each month and will pay six per cent. interest on the amount of my purchases. I am employed by John Smith and have been with him for two years. Previous to that I worked for John Brown. I rent my house of John Green, to whom I refer you. I buy my dry goods of John Black and my meat of John White. In case I do not pay my bills promptly on the first of each

month you are authorized to use this as an order on John Smith for my wages.

"Very respectfully,

"JOHN REDDING."

In this blank form the words in italics are those which the applicant is to write. The form can be varied indefinitely or not used at all, but the principle remains the same: Investigation before trusting people with your goods. You not only submit to it in buying, but expect it, and the same principle should govern you in selling. Credit is impossible without confidence, and confidence is disastrous without knowledge. We undertake to say that there would be fewer victimized merchants if some such credit investigation was universal. There is no reason why it should not become universal, because it is just, and honest men admire justice. Always remember and teach your customers to remember that "money talks," and that "credit is an excellent walking stick, but a treacherous crutch."

Legal Decisions.

ASSIGNMENT FOR BENEFIT OF CREDITORS.

C. & H. made a general assignment, and their balance in bank was \$3069.61. The bank had discounted notes for them for \$11,500, of which \$7000 fell due, and protests were made before the assignee demanded the amount on deposit. This demand was refused on the ground that the bank had the right to set off the indebtedness of C. & H. to it against their balance on deposit. The assignee then brought suit—Chipman *vs.* Ninth National Bank—but was defeated, the court ruling that the bank's contention was correct. The case was carried to the Supreme Court of Pennsylvania, where the judgment was reversed. Judge Sterrett, in the opinion, said: "It is clear that at the date of the assignment the bank had no lien or set-off against the amount then on deposit to the credit of C. & H., and that the assignee, by virtue of the assignment, and as trustee for the creditors, was then entitled to assert his and their right to any property of the assignors which passed by the assignment, against any person claiming by subsequent transfer, attachment, judgment, execution or any other lien. The reason of this is that the rights of the assignor's debtors and of his creditors are fixed by the assignment. The creditors cannot attach or levy on the assigned assets, and the debtors cannot buy up claims against them and set them off against claims against the assigned estate. The bank, in this case, had no right of action at the date of the assignment, and as a creditor of the assignors, holding notes that matured after all of their property, including the money deposit, had passed to the assignee in trust for all of the creditors, the bank is in no better condition than they are. The deposit must be paid over to the assignee, and the bank must take its place among the other creditors."

SALE OF PROMISSORY NOTES.

W. & Son became insolvent, and S., who held \$7500 of their unpaid notes, agreed to sell them to G. for \$3000. He, however, refused to deliver the notes, though he knew they were bought for a certain purpose, and G. brought suit to compel him to do this instead of suing for damages, and he got a judgment requiring the transfer of the note on the payment of \$3000. The case—Gottschalk *vs.* Stür—was carried to the Court of Appeals of Maryland, where the judgment was affirmed. Judge Robinson, in the opinion, said: "Though the courts will not in all cases decree the specific performance of a contract for the sale of goods and chattels, because there is an adequate remedy at law in damages,

yet it is well settled that when there is an agreement to buy a specific chattel for a specific purpose, and this purpose can only be answered by the delivery of the chattel itself, or where from the nature of the subject matter of the agreement the measure of damages must necessarily be uncertain, or where damages will not be as beneficial to the purchaser as the performance of the contract, equity will interfere and decree the specific performance of the contract; because in such cases an action at law for a breach of the contract will not afford the purchaser a complete and adequate remedy. Now, in this case these notes were bought to be used for a specific purpose; a judgment for damages for their value cannot be recovered, for their value cannot be shown, as the makers are insolvent, and it is very evident that to do justice here we must affirm the judgment below which compels the transfer of these notes upon the payment of the price fixed, \$3000.

CORPORATION SUIT BY ONE STOCKHOLDER TO COMPEL AN ACCOUNTING.

D. was a stockholder in the Travelers' Newspaper Association, and he sued for an account in behalf of himself and such other stockholders as should elect to come in the corporation, and Roland Worthington and Roland Worthington, Jr., as directors of the company. It was alleged that Roland Worthington is the president and treasurer of the association, and has long controlled the majority of its stock, by means of which control he has chosen such persons for directors as he has seen fit; has improperly invested money; has kept uninvested large sums of money; has given himself an excessive salary, and has charged an improper and unjust rent for the premises occupied by the corporation, and owned by him. The relief asked was an accounting, a return of moneys improperly taken, a just distribution of the profits of the concern, and that all the funds in excess of \$5000 be paid out to the stockholders. There was no allegation that D. had applied to the officers of the corporation for an account, or that he had brought his grievances before the association itself to get relief. The defendants demurred, and the case—Dunphy *vs.* Travelers' Newspaper Association—was taken to the Supreme Judicial Court of Massachusetts for argument. Judge Knowlton, in sustaining the demurrer, said: "Stockholders must seek relief first through corporate channels, surely one stockholder cannot of his own will force the corporation into a course of litigation. Still, if the corporation itself refuses to redress fraudulent acts, a stockholder can have relief in a court of equity. In this bill in equity there are sufficient allegations of Roland Worthington's contract of the board, but it does not show that any effort was made to get relief from the corporation itself, and there is no allegation of any fraudulent combination between Roland Worthington and the other directors to injure the corporation and the plaintiff. The bill is therefore insufficient, and the demurrer must be sustained."

The East Birmingham Iron Roofing and Corrugating Company, of Birmingham, Ala., have been reorganized by the election of the following officers: President, General Rucker, of Alabama; vice-president and treasurer, Joseph F. Johnston, president of the Alabama National Bank. The above, with H. P. Lloyd and L. L. Sagendorph, constitute the Board of Directors. S. H. Wilkes, the acting manager of the company, reports a prosperous business and the outlook promising.

Mayor Hewitt has already forwarded for the relief of Jacksonville over \$36,000.

Foreign Markets.

EQUIVALENTS

	Cents.
Franc, Peseta or Lira.....	19.3
Florin (Netherlands).....	10.2
Florin (Austria).....	35.0
Millreis (Portugal).....	54.8
Millreis (Brazil).....	54.8
Mark (Germany).....	23.8
	Pounds.
Kilogram.....	220.5
Picul.....	134.

WEST INDIES.

PORT OF SPAIN, TRINIDAD, August 17, 1888.—*Asphaltum*.—Our market has been moderately active and well sustained at \$14.04 per ton, inclusive of export duty, boiled and crude, at \$6.84. Exportation since January 1 amounts to 35,131 tons, against 29,578 last year and 21,889 in 1886. *Exchange*, 90 days' sight, \$4.84.—*E. P. Masson*

CHINA.

CANTON, July 28, 1888.—*Silver Coin*.—The Chinese Government has made a contract with Mr. Heaton, of Birmingham, England, for a complete set of mint machinery for the coining of Silver dollars and fractional coin with a capacity of turning out \$128,250 per day, or 2,700,000 coins, including Copper coin. The latter will have the traditional square perforation in the center. *Iron and Coal Mines*.—A railroad is to be built to connect Packhoi with the rich mines at Lientchu, in the Longchuan district.—*Weekly Mail*.

EAST INDIES.

SINGAPORE, July 25, 1888.—*Tin*.—Our last report was dated 11th inst., since when the advance in London has given buyers more confidence, and sellers have begun to realize their holdings. About 200 tons have changed hands at up to \$34.50 per picul, with buyers at this price still offering. *Gum Copal*.—There are large stocks which are offering at some decline, but the demand is lifeless. *Gum Damar*.—The arrivals have been of inferior quality; we quote \$17.50 per picul for Lingah. *Tonnage*.—London rates are steady at 25/ @ 30/ for weight. For New York via Canal there is no tonnage offering; via Cape the Tabique and Sonntag have been circulated at 25/ for weight. For Boston the Hooghly loads on charterer's account. *Exchange* is quoted 3/1, for six months' sight credits. Tin shipments from the Straits Settlements to the United States during the first six months have been as follows: 1888, 13,877 piculs; 1887, 43,075; 1886, 31,533; 1885, 16,051; 1884, 26,651, and 1883, 52,489.—*Gilfillan, Wood & Co.*

PENANG, August 4, 1888.—*Tin*.—Since our last report of the 20th ult. receipts amounted to 11,000 piculs, of which Europeans took 7200 and Chinamen 3000. Prices meanwhile advanced from \$33.65 to \$34.50, but the exchange on London brought the quotation down to \$34.10 at the close. *Exchange*, four months' bank, 3/3¼.—*Schmidt, Kustermann & Co.*

MANILA, September 10, 1888.—*Hemp*.—During the week there have been buyers at \$10.25 per picul, against \$9 same time last year, equaling per ton, cost and freight, £35, against £33. The clearances for the United States since last cable have been 16,000 bales, against none in 1887, and since January 1 125,000, against 150,000; there are still loading for the same destination 42,000, against 20,000. Cleared for England since January 1, 242,000 bales, against 148,000, and loading 1000, against 8000; cleared for all other countries, 51,000, against 29,000; receipts at all ports since last cable, 28,000, against 10,000, and since January 1, 427,000 bales, against 344,000 last year and 276,000 in 1886. *Freight*, \$6, against \$6. *Exchange*, 3/5, against 3/9.—*Ker & Co. to Charles Nordhaus, New York, per cable direct*

COLOMBO, CEYLON, August 2, 1888.—*Plumbago*.—Since our last report the market has exhibited great firmness; we quote in rupees, per ton: Large lumps, 145 @ 170; Ordinary lumps, 125 @ 160; Chips, 80 @ 95, and Dust, 40 @ 65. Following are the shipments made since October 1: To England 67,547 cwt.; to Marseilles, 38; to Trieste, 523; to Hamburg, 10,942; to Antwerp, 3964; to Bremen, 2012; to India, 82; and to the United States 130,332—together, 215,440, against 214,858 cwt. last year, 173,844 in 1886, and 171,929 in 1885. *Coin Yarn*, Nos. 1 to 4, may be quoted 7 @ 12 rupees per cwt. *Exchange*, 6 months' sight credits, 1/4 15-32.—*Volkart Bros. through their Agent, John W. Greene, 82 Wall street, New York*.

SPAIN.

BILBAO, September 1, 1888.—*Iron Ore*.—There has been great animation during the week, the tendency at the same time being upward. We quote Campanil 7/6 @ 8/1, and Rubios, 6/10 @ 7/3; in a few instances, on smaller lots, an advance has been submitted to. The week's shipments sum up 66,877 tons, which

is nothing very great, compared with former years at this season, but it appears that many steamers in the habit of calling here for cargo went elsewhere to earn bigger freights. Total shipments hence since January 1 aggregate 2,560,999 tons, against 3,070,284 last year. *Pig Iron* is firm; coastwise 874 tons were shipped and abroad 1496.

Export from Spain During the first Six

	Months.	1886.	1887.	1888.
	Tons.	Tons.	Tons.	
Calamine.....	18,217	17,634	16,601	
Pyrites.....	358,386	403,061	418,720	
Iron Ore.....	2,183,831	2,713,736	2,375,875	
Pig Iron.....	27,655	59,288	34,863	
Precipitate.....	13,396	13,745	13,541	
Quicksilver.....	512	1,093	857	
Pig Lead.....	54,780	66,349	65,040	

Totals... 2,656,777 3,274,906 2,925,497

With the exception of Pyrites every item shows a retrograde movement. Spot *Pig Iron* quotations are 57 @ 60 pesetas or francs per ton, f.o.b., futures, 55 @ 58; Lingotillo at Huelva or Seville, 65.—*Bilbao Marítimo y Comercial*.

GERMANY.

HAMBURG, September 8, 1888.—*Iron*.—The Rhenish-Westphalian *Pig Iron* market has been steady. Spiegel has been quiet on the whole at 54 marks for 10 % @ 12 %, the home market being dull and nothing doing for American account. English consumers have had a good chance to resume purchases and their operations continue. Stocks are the same as last year. The new orders are all the way to the close of 1888. Forge *Pig* has ceased to be offered so very low from Siegen, where the price is now 46 @ 47. Foundry *Pig* is sustained; Thomas is selling best; Luxembourg is quoted 40.50; English Bessemer, 44/6. Merchant *Iron* is doing better, both at home and for export; prices are moderately remunerative. Boiler Plates are as active as ever and Thin Sheets are also looking up. Both foundries and machine shops are in a flourishing condition and the tendency in Castings is upward. Car works do a large trade, and, two months hence, there will be added the Government adjudications. The quotations at the works are: For Merchant *Iron*, 125 @ 127.50 marks per ton; Hoops, 132.50 @ 135; Bessemer Billets, 135, and Steel Rails, for mines, 115. The Schwartzkopff Machinery Company have declared a dividend for the fiscal year just ended of 22 %, against 35 % the previous year, sales of machinery not having exceeded 5,000,000 marks, against 8,820,000 then. The Rhenish Steel Works have declared an 11 % dividend, against 9 %; the difference arises from the low price obtained for Steel Rails. Wire Rods, after deducting the export bonification, are selling at 115 marks. *Metals*.—Lead has been firm, both Copper and Spelter are improving.—*Bor-senhalle*.

RUSSIA.

ST. PETERSBURG, September 3, 1888.—*Petroleum*.—The movement to substitute Naphtha for Coal is making steady headway in a good many localities in Russia. Thus, at Moscow, Naphtha supersedes Coal rapidly as a fuel for manufacturing purposes. The saving in freight is so great that the cost of Naphtha as a fuel is only 7 rubles, where that of Coal is 10. The influence of this change is already felt in the Donetz Coal Basin and the industries there existing. Miners are scarce and the supply of Coal is insufficient; hence in every direction Naphtha is resorted to. At Odessa the scarcity of Coal is causing great inconvenience and there is a general outcry against the duty on English Coal.—*Journal de St. Petersburg*.

An improved Air Pump.

The ordinary type of air pump with clack valves is open to two objections. Whether it be a vacuum or compression pump, the piston only begins to draw in a fresh charge of air when it has advanced a certain distance, and thus reduced the pressure behind it to something less than exists in the inlet pipe. The quantity of air drawn in during a complete stroke of the piston is therefore always less, and may be considerably less than the volume swept by the piston. This reduction in the volumetric efficiency of the pump depends on the amount of clearance space, and on the ratio between the pressure in the inlet and that in the discharge pipe. With a clearance of 5 per cent., a vacuum pump of the ordinary type would only have 50 per cent. volumetric efficiency when producing a vacuum of one-tenth of an atmosphere; and if required to exhaust

down to one-twentieth of an atmosphere the volumetric efficiency would be reduced to zero—that is to say, the valves would not open at all, and no air would be discharged. If the pump be required for compression a limit of pressure would similarly be reached when no more air could be discharged. To make up for the loss in volumetric efficiency, even when working below this limit, it is necessary to employ a larger pump than would suffice if the clearance space could be reduced to zero. This is, of course, a practical impossibility; but this space is sometimes reduced to a certain extent by the introduction of water in the so-called wet-air pumps. These pumps must, however, be worked at a low piston speed to avoid shocks. These defects of the ordinary air-pump have been remedied in the type introduced by Messrs. Burckhardt & Weiss, of Basle, Germany. A description and illustrations are published in a recent issue of *Industries*. The clack valves, which cannot be used in a pump running at high speed, have been replaced by an ordinary slide-valve; and the prejudicial effect of the clearance space has been minimized by an ingenious contrivance, which, at the end of every stroke, permits the air in front of the piston to pass round it to the other side. A device of this kind had already been introduced for air-pumps nearly ten years ago. It consisted of short channels or grooves placed at either end of the cylinder in such a position that the piston, when at the limit of its stroke, establishes communication between the two sides of the cylinder.

This somewhat primitive method has been improved upon in the pump we are about to describe. A channel is placed within the slide-valve, by means of which the two ports are momentarily brought into communication at each end of the stroke. The compressed air in front of the piston is thereby permitted to pass round through these channels to the back of the piston, so that when the return stroke commences, the pressure behind the piston is very nearly that existing in the inlet-pipe, whilst the quantity of air which has passed to the other side of the piston is expelled, together with air drawn in at the previous stroke. We may here remark that a similar arrangement—viz., a small channel within the slide-valve, is sometimes used in steam engines to admit a cushion of steam to the front of the piston just before it reaches the end of its stroke. The slide-valve of the pump in question carries on its back a clack-valve, held on by a spring. The object of this arrangement is to prevent the air in the outlet-pipe from rushing back at the beginning of each stroke, when the air within the cylinder has not yet been compressed to the same degree as at the end of the stroke. If air were allowed to flow back, this would not lower the volumetric efficiency of the pump; but as the pressure against the face of the piston throughout the whole of the stroke would be equal to or slightly larger than the pressure in the delivery pipe, it would entail a waste of power, and reduce the dynamic efficiency. By putting a clack-valve on the top of the slide-valve, the full pressure of the discharge is kept away from the piston until some later point in the stroke, when the air within the cylinder has been compressed sufficiently to open the clack-valve, and flow out into the valve-chest and delivery pipe. The machine is a combined steam engine and air pump, both the steam and air cylinder being bolted to the same cast-iron bed plate.

The steamship City of New York is said to have burned 290 tons of coal a day, when running at three-quarters speed.

Humphrey's Wood-Workers' Knife.

By means of the engraving herewith we lay before our readers a very convenient tool, which is being offered the trade by the Humphrey Tool Company, of Warren, Mass. The manufacturers state that while this knife, by reason of its shape and construction, is peculiarly adapted for

The manufacturers emphasize the simplicity of this arrangement, the absolute firmness with which the bolt head is held in place, and the convenience that results from having a latch thus reversible. The latch is made with heavy japanned iron case, 4 x 2½ inches, heavy brass bolt, nickel-plated draw-back and turn stop knobs, bronze stop escutcheon, five

tion of doing the best work, no leaks occur, no paint is allowed on the boiler until after it has been tested, and in many cases 150 pounds pressure does not cause one drop of water to come through seams.

The Samson Jack.

This article, an illustration of which is herewith given, is manufactured by Biglin & McMullan, 589 Hudson street, New York, for whom J. C. McCarty & Co., 97 Chambers street, New York, are agents.



Humphrey's Wood-Workers' Knife. Handle and Blade apart.

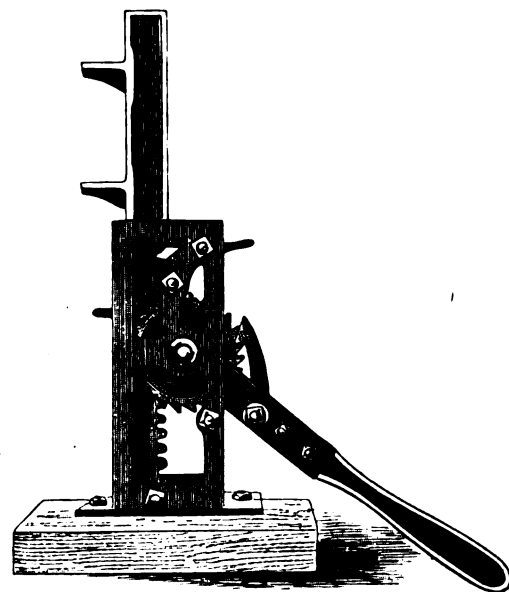
use by woodworkers, it will be found very convenient and useful in many other lines of trade. The handle of the knife is made of hardwood and tipped with brass, which renders it very strong and durable. It is smoothly finished and of such shape and size as to easily fit the hand of the operator. The blade, which is 6 inches long, is made of the best quality cast steel, carefully tempered and tested. It is V-shaped in cross section and fits an opening of corresponding shape in the end of the handle. A set-screw, not shown in the engraving, is placed in one end of the handle, and when the blade is in position forces it firmly into the bottom of the opening in the handle; by this means any length of blade desired may be secured. The construction is such that when the knife is not in use the blade may be reversed in the handle, which protects the edge and tends to keep it sharp. Two widths of blade are made—viz., 1½ and 1¾ inch. In the engraving presented herewith the blade and handle are shown apart.

tumblers and two flat keys. They are packed separately in boxes with both box nosing and flat brass striker.

New Snatch-Block.

The Cleveland Block Company, Cleveland, Ohio, have patented and are introducing to the trade a new style of snatch-block which is illustrated in the accompanying cuts. This block has, it will be observed, a sliding strap to which is attached the hook and through a slot in which the steel pin passes. With this construction the block, it is claimed, when closed and ready for use, is as strong as a tackle block with both sides complete, and it is alluded to as combining safety, strength, ease of manipulation and general efficiency.

The latest idea in boiler construction, says the *Locomotive*, is to leave several bad leaks in the boiler to allow for expansion. Expansion of what is not stated, but some one who is described as a competent engineer says it is so, and that boiler-makers

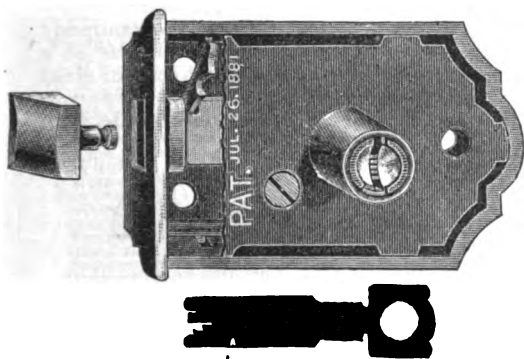


The Samson Jack.

The jacks are made under patent of John Parr, of which the manufacturers are sole owners. They are described as made of the best refined malleable iron, thus securing great strength, and the point is made that they will last for years without repair, and are warranted not to break. As will be seen from the illustration, the jack is

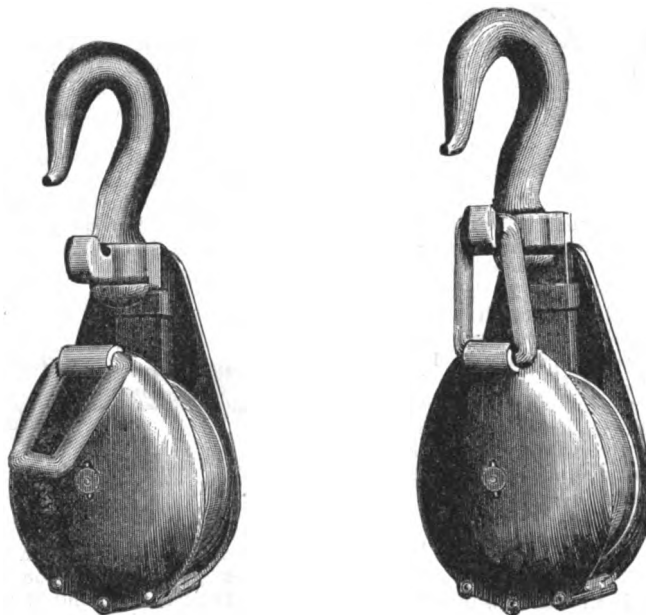
Barnes' Reversible Night Latch.

This article, which is made by the Barnes Mfg. Company, New Haven, Conn., for whom Sise, Gibson & Co., 100 Chambers street, New York, are sole agents, is represented in the illustration herewith given,



Barnes' Reversible Night Latch.

in which part of the cap is broken away in order to show the construction, which is the special feature of the latch. As indicated in the cut, the latch can be made either plain or reverse bevel as desired. To accomplish this the cap is to be removed and the small lever which rests on the head of the bolt raised, when the bolt head can be drawn out, permitting it to be turned over and replaced, when the lever being shut down tightly and the cap replaced, the operation is completed. The cut shows the lever up and the bolt head out and ready for reversing.



New Snatch-Block.

prefer to have new work show leaks for the above reason. Now, this may be so, but if it is, why is it that seams are calked destructively, painted sometimes, puttied, and even have driven into them wooden shims to prevent leaks when getting ready for the hydrostatic test? And why is it that in those shops where they have the reputa-

operated by a handle or lever bearing a pawl, which catches into a ratchet-wheel, and on the shaft of this ratchet-wheel is a pinion, which engages with the rack. On the lever there is a spring bearing on the pawl, by which its efficiency in working is secured. There is also another pawl, shown in the cut, which prevents the turn-

ing of the ratchet in the reverse direction while lifting the lever for a new stroke. With this construction and the strength of the parts it will be seen that the jack is capable of lifting a heavy load with ease and efficiency. The load can also be lowered without difficulty. These jacks are made in three sizes, No. 0, the metal portion of which weighs 8 pounds, adapted to the use of light vehicles, such as carriages and business wagons, with a lifting capacity of 1500 pounds; No. 1, the metal parts of which weigh 14 pounds, adapted to the intermediate weights of wagons and trucks, and has a lifting capacity of 3000 pounds, and No. 2, which is shown in the illustration, the metal parts of which weigh 24 pounds, adapted for all kinds of heavy work, such as heavy trucks, vans, express wagons, &c. This size is in use in the New York Fire Department, and is also used by a number of well-known houses whose business requires the use of heavy wagons and trucks. The manufacturers emphasize the merits of these jacks as being increased power, quickness of motion and saving of time and labor, and offer them to the trade, confident that they will be found to supply a want.

Eureka Pipe Bending Appliance.

A device of especial interest to the plumbing trade is being manufactured by H. A. Haskell, 38 Chardon street, Boston, Mass., his New York agents being the Colwell Lead Company, 63 Centre street. The Eureka Pipe Bending Appliance consists of a tightly coiled steel wire spring, wound to a size that will just fill the pipe. Its application is exceedingly simple, as all that is necessary to do is to insert it in a pipe and then bend the pipe into any desired shape. The appliance, in other words, serves the purpose of a core, and beside being much more convenient than filling the pipe with sand or rosin, it is



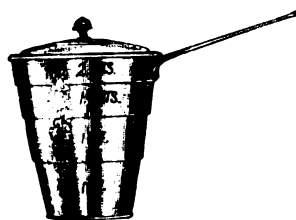
Samples of Bent Pipe.

said, furthermore, that the results are much better. When the pipe is bent to the desired shape the bender is turned a few times to the right which, tightening the coil, permits it to be withdrawn from the pipe. It is spoken of as especially useful in bending lead pipe above 1 inch in size for goose-neck or other irregular forms without flattening or collapsing. The illustrations herewith given show pipes bent by the aid of the Eureka Pipe Bending Appliance, and are presented as illustrations of the even work which it accomplishes. The device is at present made in eight sizes from 1 to 3½ inches.

Combined Measure and Steam Cooker.

In the accompanying illustration we present a general view of an improved steam tea-kettle cooker and measure combined, which is being placed upon the market by Mr. H. M. Hillson, Lewis and Fulton streets, Boston, Mass. The device is made of the best charcoal tin plate, with the body stamped in one piece. It is provided with a strong handle and a

cover which closely fits the top. The utensil is made tapering from the top toward the bottom, and it is claimed will fit any tea-kettle. The body of the vessel is stamped in such a way as to indicate



Hillson's Steam Cooker and Measure Combined.

various capacities, ranging from 1 pint up to 2 quarts, the figures being clearly shown in the engraving. The device is neatly finished, and it is stated that when once introduced no housekeeper would be without one. As a pudding boiler it is

business portions of enterprising towns and cities. In nearly every such instance some of our hardware friends have been among the victims. One of the latest towns to suffer a loss of this character is Washburn, Wis., across the bay from Ashland, which was visited by a serious conflagration on the 14th inst., causing an aggregate loss of \$150,000. Included in the list of business houses destroyed is that of Peter Nelson, hardware merchant, whose loss is put at \$15,000.

The New Ideal.

The annexed cut will give the reader an idea of a complete and compact implement for loading brass or paper shot-gun shells. This tool is being put on the market by the Ideal Mfg. Company, P. O. Box 1064 B, New Haven, Conn. Its operation is thus described: To expel the exploded caps unscrew threaded head C as far as it will go; slip up the rammer D, which will project pin at E ready for decapping. To recap, screw the head C down until the



The New Ideal.

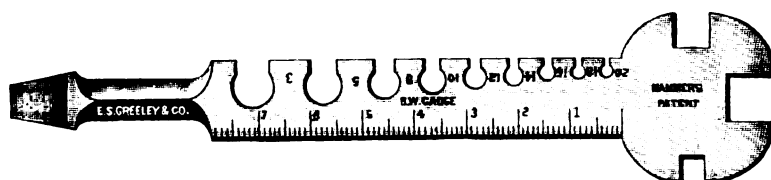
claimed to be without a rival. Patents are pending, covering the principal features of construction. The vessels are packed in bundles of one dozen each.

Electricians' Pocket Tool.

The E. S. Greeley & Co., 5 Dey street, New York, are putting on the market a pocket tool for electricians which possesses a number of useful features. The shape and general appearance of the article is shown in the illustration, the cut being a slight reduction from the actual size. It is described as made of the best tool steel, and is nickel-plated and of fine workmanship. Beginning at the right of the cut it will be noticed that there are three wrenches, ½, ¾ and 1 inch size respectively. The top of the tool is formed into a wire gauge, the particular illustration showing the Birmingham wire gauge, though it is also made for the other standard gauges. The other edge, as shown, is a millimeter scale, while

point of screw at A is about flush (as in cut); start primer in pocket of shell, and place head of shell in slot B, and one-quarter of a turn of the rammer will force the primer home. The screw is quadruple thread, and travels ¼ inch in one turn. For extracting shells that may stick in gun put slot B over head of shell, and use rammer as a handle. When used as a rammer screw head C down as far as it will go; this will withdraw the decapping pin within the rammer, leaving all compact and the end flat. The operations are referred to as all simple and quick and efficient.

The Philadelphia Natural Gas Company, of Pittsburgh, has adopted a system of measurements by which it can estimate pretty accurately the exact amount of gas consumed by a large mill or manufactory in a year. By experiments the company has ascertained just how much gas at a certain furnace will pass out a certain sized orifice in a given time. Before any contracts are renewed or new ones made with



Electricians' Pocket Tool.

the reverse side is scored in inches, admitting a ready comparison of the two scales. The left-hand end of the tool is a screw driver, while between it and the gauge part the metal is ground down so that it can be used as a stripper for insulated wire, a cleaner or pencil sharpener. The tool is neatly finished and provided with a case that permits it to be conveniently carried in the pocket.

It has been our lot of late to chronicle quite a number of destructive fires in various parts of the country, devastating the

manufacturers, expert measurements are sent to the mill. Each furnace is carefully inspected, and all measurements and estimates reduced to writing for use of the company. After these have been carefully gone over, the price is given.

The Old Dominion Iron and Nail Works Company, of Richmond, Va., are distributing nails manufactured from the iron plates of the Confederate ram Merrimac, famous for its fight with the first monitor. They are in demand as mementoes of the first naval engagement of the civil war.

CURRENT HARDWARE PRICES.

SEPTEMBER 19, 1888.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers at the figures named.

Ammunition.

Cape, Perfection, 7000—	
Black & Goldmark's	
F. L. Waterproof, 1-10's	50¢
M. B. Trimmed Edge, 1-10's	25¢
M. B. Ground Edge, Central Fire, 1-10's	74¢
Double Waterproof, 1-10's	\$1.40
Market Waterproof, 1-10's	50¢
G. D.	30¢
B. B.	30¢
Union Metallic Cartridge Co.	
F. O. Trimmed	50¢
F. L. Ground	55¢
Con. Fire Ground	70¢
Double Waterproof	\$1.40
Double W. & Prof. 1-10's	\$1.40
B. B. Genuine Imported	45¢
May's B. B.	54¢
May's D Waterproof, Central Fire	\$1.60

Cartridges.

Rim Fire Cartridges	dis 50¢5&2
Rim Fire Military	dis 15¢2
Central Fire Military and Rifle	dis 15¢2
Central Fire Military & Sporting	dis 15¢2
Blank Cartridges, except 33 and 33 cal., an additional 10% over above discounts.	
Blank Cartridges, 33 cal.	\$1.75, dis 2
Blank Cartridges, 33 cal.	\$3.50, dis 2
Primed Shells and Bullets	dis 15¢2
B. B. Cape, Round Ball	\$1.75, dis 2
B. B. Cape, Conical Ball, Swaged	\$2.00, dis 2

Primers.

Berdan Primers all sizes, and B. L. Caps (for Sturtevant Shells)	\$1.00, dis 2
All other Primers, all sizes	\$1.30, dis 2

Shells.

First quality, 4, 8, 10 and 12 gauge, dis 25¢10&2	
First quality, 14, 16 and 20 gauge (\$10 list)	dis 30¢10&2
Star, Club, Rival and 10 gauge, \$0 list	dis 33¢
Climax Brands, 12 gauge, \$8 list	\$10 2
Club, Rival and Climax Brands, 14, 16 and 20 gauge	dis 30¢10&2
Self-Boiled Combination Shot Shells	dis 15¢2
Grass Shot Shells, 1st quality	dis 30¢2
Grass Shot Shells, Club, Rival, Climax	dis 30¢2
A. R. & C. Co., I. X. L., 10 & 12 gauge, d	40¢5&2
A. B. & C. Co., "Special," 10 gauge, dis 30¢1	45¢2
A. R. & C. Co., "Special," 10 & 12 gauge, 40¢10&2	
Fowler's Patent, 10 & 12 gauge, \$ 100	\$3.75

Shells Loaded.

List No. 19, 1887	dis 20 & 10
U. M. C. & W. R. A.—B. E., 11 up	\$2.00
U. M. C. & W. R. A.—B. E., 9&10	2.30
U. M. C. & W. R. A.—B. E., 7&8	3.00
U. M. C. & W. R. A.—P. E., 11 up	3.10
U. M. C. & W. R. A.—P. E., 9&10	4.00
U. M. C. & W. R. A.—P. E., 7&8	4.00
May's B. E., 11 up	\$1.75
May's P. E., 11 & 90	\$2.30
A. V. & Co., Eagle Anvil	\$ 104, dis 30 & 30&2
Peter Wright's	94¢
Armstrong's Mouse Hole	84¢
Armstrong's Mouse Hole, Extra	114¢
Freeman's	94¢
Wilkinson's	94¢
J. & Riley Carr. Patent Solid	114¢
Small Vise and Drill	
Willers Falls Co.	\$15.00, dis 30
Cheney Anvil and Vise	dis 25
Allen Combined Anvil and Vise	\$3, dis 40&10
Moore & Barnes Mfg. Co.	dis 33¢

Augers and Bits.

Douglas Mfg. Co.	
New Haven Copper Co.	
Wm. A. Ives & Co.	dis 70
Humphreysville Mfg. Co.	
French, Swift & Co. (F. H. Beecher)	
Cook's, Douglas Mfg. Co.	dis 55
Cook's, New Haven Copper Co.	dis 50&10&50&10&2
Ives' Circular Lip	dis 40
Patent Solid Head	dis 30
J. B. Jennings & Co., No. 10, extension lip	dis 40
J. B. Jennings & Co., No. 30	dis 50
J. B. Jennings & Co., Auger Bits, in fancy boxes	dis 30
Set, 33¢ quarters, No. 5, 30; No. 30, 30	dis 45
Low's Patent Single Twist	dis 45
Russell Jennings' Augers and Bits	dis 45
Imitation Jennings' Bits new list	dis 60&10&2
Fugh's Black	dis 30
Car Bits	dis 50&10&2
Thommedieu Car Bits	dis 15&10
Forstner Pat. Auger Bits	dis 10
Follow Augers—	
Ives	dis 55&10
French, Swift & Co.	dis 55&10&2
Douglas	dis 40&10
Bonney's Adjustable \$ 50	dis 20&10
Stearns	dis 20&10
Ives' Expansive, each \$4.50	dis 60&10
Universal Expansive, each \$4.50	dis 30
Wood's	dis 35 & 35&10

Staples and Bits.

Clark's small, 118; large, 200	dis 35 & 35&2
Ives' No. 4, per doz, 300	dis 35 & 40
Swan's	dis 40
Stearns, No. 1, 200; No. 2, 300	dis 35
Stearns' No. 2, 345	dis 30
Small Bits—	
Common	\$ 2.75 & \$3.25
Diamond	\$ 3.10, dis 25&10
"See" "	dis 25 & 25&2
Double Cut, Shearpoint	dis 45 & 45&2
Double Cut, Ct. Valley Mfg. Co.	dis 30&10
Double Cut, Hartwell's, \$ gro.	35
Double Cut, Douglas	dis 40&10
Double Cut, Ives	dis 60 & 60&2

31 Shot Drills.

Morse Twist Drills	dis 50&10&2
Standard	dis 50&10&2
Cleveland	dis 50&10&2
Syracuse, for metal	dis 50&10&2
Syracuse, for wood (wood list)	dis 30 & 30&2
Williams or Holt's, for metal	dis 50&10&2
Williams or Holt's, for wood	dis 40&10

Awl Blades.

Sewing, Brass Ferrule	\$3.50 \$ gross—dis 45&10
Patent Sewing, Short	\$1.00 \$ gross—dis 40&10
Patent Sewing, Long	\$1.20 \$ gross—net

Patent Peg, Plain Top	\$10.00 \$ gross—dis 45&10
Patent Peg, Leather Top	\$12.00 \$ gross—dis 45&10

Awls, Brad Sets, &c.

Wls. Sewing, Common	\$ gross \$1.70—dis 35
Wls. Shouldered Peg	\$ gross \$2.45—dis 40&10
Wls. Patent Peg	\$ gross \$3.45—dis 40&10
Wls. Shouldered Brad	\$2.70 \$ gross—dis 35
Wls. Handled Brad	\$7.50 \$ gross—dis 45
Wls. Handled Scratch	\$7.50 \$ gross—dis 45&10
Wls. Socket Scratch	\$1.50 \$ gross—dis 25 & 30

Awl and Tool Sets.

Allen's Sets, A. Wls. & Tools, No. 30, \$10—dis 55&10	
Tray's Ad Tool Hds., Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	
Miller's Falls Ad. Tool Hds., Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	
Tenry's Combination Haft	\$ 20
Brad Sets, No. 42, \$10.50, No. 43, \$12.50	dis 70&10&2
Brad Sets, Stanley's Excelsior, No. 1, \$7.50	
Brad Sets, Stanley's Excelsior, No. 2, \$4.00	
Brad Sets, Stanley's Excelsior, No. 3, \$5.50	dis 30&10

Axes.

Makers' and Special Brands—	
First quality	\$ 20.00 & \$25.50
Others	\$ 20.50 & \$25.75

Axle Greases.

Trassers, in bulk	Keg \$ 4.40; Pail, \$ 5.40
Trassers, in boxes	\$ gross \$5.50
Dixon's Everlasting, in box, \$ 10	\$ 12.00; 2 \$ 23
Dixon's Everlasting, 10-lb pails, each, 85¢	
Lower grades, special brands	\$ gro \$5.50 & \$7

Axles.

No. 1, 4¢ @ 4¼¢ No. 2, 5¼¢ @ 5½¢	
No. 3, 6¢ @ 6¼¢ No. 4, 7¢ @ 7¼¢	
No. 5, 8¢ @ 8¼¢ No. 6, 9¢ @ 9¼¢	
No. 7, 10¢ @ 10¼¢ No. 8, 11¢ @ 11¼¢	
No. 9, 12¢ @ 12¼¢ No. 10, 13¢ @ 13¼¢	
No. 11, 14¢ @ 14¼¢ No. 12, 15¢ @ 15¼¢	
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No. 221, 224¢ @ 224¼¢ No. 222, 225¢ @ 225¼¢	
No. 223, 226¢ @ 226¼¢ No. 224, 227¢ @ 227¼¢	
No. 225, 228¢ @ 228¼¢ No. 226, 229¢ @ 229¼¢	</

File and Machines.

Knox, 4 1/2-inch Holes.....	\$2.25 each	dis 25 1/2
Knox, 4 1/2-inch Roll.....	\$2.00 each	dis 25 1/2
Keagle 3 1/2-inch Roll.....	\$2.15, dis 25 1/2	
Keagle, 3 1/2-inch Roll.....	2.25, dis 25 1/2	
Crown, 1 1/2 in., \$3.50; 6 in., \$4.00; 8 in., \$5.50 each, dis 25 1/2		
Crown Jewel.....	6 in., \$2.50 each, dis 25 1/2	
American, 5 in., \$5; 6 in., \$3.40; 7 in., \$4.50 each, dis 25 1/2		
Hand Fluter.....	\$2.50 each, dis 25 1/2	
Geneva Hand Fluter, White Metal.....	7 dos \$12, dis 25 1/2	
Crown Hand Fluter, No. 1, \$15; 2, \$12.50; 3, \$10.00 each, dis 25 1/2		
Shepard Hand Fluter, No. 55.....	7 dos \$15.50, dis 40 1/2	
Shepard Hand Fluter, No. 110.....	7 dos \$11, dis 40 1/2	
Shepard Hand Fluter, No. 98.....	7 dos \$5, dis 40 1/2	
Clark's Hand Fluter.....	7 dos \$15.00, dis 30 1/2	
Combbed Fluter and Sad Iron.....	7 dos \$10.00, dis 30 1/2	
Buffalo.....	7 dos \$10.00, dis 10 1/2	

Fluting Scissors..... dis 45 1/2

Fly Traps..... 7 dos \$1.50 @ 1.75

Feeder Squeezers..... 7 dos \$2.00

Blair's..... 7 dos \$1.25

Blair's, "Climax"..... 7 dos \$1.25

Perkins—day, Mature, &c. Assoc. list..... dis 60 @ 60 1/2

H. J. Mature & Co., Phila. list..... dis 60 @ 60 1/2

Plated, see Spoon

Freezers, Ice Cream..... dis 60 @ 10 1/2

Buffalo Champion..... dis 65 1/2

Shepard's Lifting..... dis 65 1/2

White Mountain..... dis 65 1/2

Fruit and Jelly Presses..... dis 30 @ 10 @ 30 1/2

Enterprise Mfg. Co..... dis \$4.50

Henry..... 7 dos \$1.50

P. D. & Co..... 7 dos \$4.50

Shepard's Queen City..... dis 40 1/2

Fry Pans.....

High List..... dis 75 @ 5 @ 75 @ 10 @ 5

No..... 0 1 2 3 4 5 6 7 8

Per doz..... \$3.75 4.70 5.50 6.25 6.55 7.50 8.75 10.00 11.25

Low List..... dis 70 @ 10 1/2

No..... 0 1 2 3 4 5 6 7 8

Per doz..... \$3.00 3.75 4.25 4.75 5.25 6.00 7.00 8.00 9.00

Fuse..... 7 1000 lb.

Common Hemp Fuse, for dry ground..... \$3.70

Common Cotton Fuse, for dry ground..... 4.75

Triple Taped Fuse, for wet ground..... 6.00

Double Taped Fuse, for very wet ground..... 7.25

Small Gutta Percha Fuse, for water..... 7.50

Large Gutta Percha Fuse, for water..... 12.00

Gauges.....

Marking Notches, to..... dis 60 @ 10 1/2

Starrett's Surface, Center and Scratch..... dis \$5 @ 10 1/2

Wire, low list..... dis 10 @ 10 1/2

Wire, Fowler, Madden & Co..... dis 10 @ 5 @ 10 1/2

Wire, Brown & Sharpe's..... dis 10 @ 30 1/2

Glimlets—Nail and Spike..... dis 50 @ 10 @ 5

"Eureka" Glimlets..... dis 40 @ 10 1/2

"Diamond" Glimlets..... dis 40 @ 10 1/2

Double Cut, Shepardon's..... dis 60 @ 10 @ 5

Double Cut, Douglass..... dis 40 @ 10 1/2

"Bee"..... 7 gross \$12, dis 25 @ 25 @ 1/2

"Glee—Le Page's Liquid..... dis 25 @ 35 @ 25 1/2

Upton's Liquid..... dis 25 1/2

W. N. Le Page's Improved Liquid Glee..... dis 25 @ 35 @ 1/2

Glee Pats.....

Family, Browne's "Eureka"..... dis 40 1/2

Family, L. F. & C.'s "Handy"..... dis 40 1/2

Grindstones..... 7 ton \$7.50 @ 9.0

Grindstone Fixtures..... dis 70 @ 10 1/2

Sargent's Patent..... dis 70 @ 10 1/2

Reading Hardware Co..... dis 70 @ 10 1/2

Hack Saws—See Saw.

Halters—Cover's, Rope, 1/4 in. Jute..... dis 50 @ 1/2

Cover's, Rope, 1/4 in. Rope..... dis 40 @ 1/2

Cover's Adj. Rope Halters..... dis 40 @ 1/2

Cover's Hemp Horse and Cattle Tie..... dis 40 @ 1/2

Cover's Jute Horse and Cattle Tie..... dis 50 @ 10 @ 1/2

Handled Hammers.....

Maydole's..... List Dec. 1, 1885, dis 25 @ 35 @ 1/2

Buffalo Hammer Co..... List Jan. 15, '87

C. Hammond & Son..... Dis. 50 @ 50 @ 1/2

Humason & Beckley..... 10 1/2

Atha Tool Co..... dis 40 @ 10 @ 50 1/2

Verree..... dis 50 1/2

Magnetic Tack, Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100..... dis 30 @ 35 1/2

Nelson Tool Works..... dis 40 @ 10 1/2

Warner & Nobles..... dis 20 @ 35 1/2

Peck, Stow & Wilcox..... dis 35 @ 10 @ 1/2

Sargent's Hammer..... dis 35 @ 10 @ 1/2

Handed Hammers and Sledges—

3 lb and under..... 7 40 1/2 dis 70 @ 10 1/2

3 to 5 lb..... 7 35 1/2 dis 75 1/2

Over 5 lb..... 7 30 1/2 dis 75 1/2

Wilkinson's Smith's..... 10 1/2 @ 11 1/2 1/2

Hand Cuffs and Leg Irons.....

Hand Cuffs..... \$15.00 7 dos. dis 10 1/2

Providence Tool Co., Leg Irons, \$25.00 7 dos..... dis 10 1/2

Towers..... dis 25 1/2

Daley's Improved Hand Cuffs: 2 Hands, Polished..... 7 dos \$15; Nickeled, \$97; 3 Hands, Polished..... dis 25 1/2

Handles.....

Iron—Fraght or Cast—

Door or Thumb.....

Nos..... 0 1 2 3 4

Per doz..... \$0.90 1.00 1.15 1.25 1.50..... dis 60 @ 10 @ 10 1/2

Rogers's Latches..... 7 dos \$3 @ 1/2

Bronze Iron Door Latches..... 7 dos \$3.00 7 dos \$3.00

Japan Iron Door Handles—Nuts, \$1.65; Plate, \$1.10; 1 no Plate, \$0.85..... not

Barn Door..... 7 dos \$1.40, dis 10 @ 10 1/2

Chest and Lifting..... dis 70 1/2

Handles, Wood—

Saw and Plane..... dis 40 @ 10 @ 40 @ 10 @ 1/2

Hammer, Hatchet, Axe, Hedge, &c..... 7 gross \$2.00

Bickory Firmer Chisel, assorted..... 7 gross 4.50 1/2

Apple Firmer Chisel, large..... 7 gross 5.00 1/2

Apple Firmer Chisel, assorted..... 7 gross 5.00 1/2

Socket Firmer Chisel, large..... 7 gross 5.00 1/2

Socket Firmer Chisel, assorted..... 7 gross 5.00 1/2

J. no Smith Co's Pat. File..... dis 50 1/2

File, assorted..... 7 gross 2.75 dis 40 1/2

Auger, assorted..... 7 gross 5.00 dis 40 1/2

Auger, large..... 7 gross 7.00 dis 40 1/2

Patent Auger, Ives..... dis 30 @ 10 1/2

Patent Auger, Douglass..... 7 set \$1.25 not

Sledge,

Climax Steel Anti-Friction dis 50
Zenith for Wood Track dis 55
Reed's Steel Arm dis 55
Challenge, Barn Door dis 50
Sterling Improved (Anti-Friction) dis 55
Veskor, No. 1, 15; No. 2, 16.50; No. 3, 18 dis 55
Chadwick dis 55
Kiddie's dis 55
The "Boss" dis 55
Best Anti-Friction dis 60
Duplex (Wood Track) dis 60
Terry's Patent dis 60
Oronk's Patent, No. 4, 13; No. 5, 14.40; No. 6, 15 dis 60
Wood Track, Iron Clad dis 60
Carrier Steel Anti-Friction dis 60
Architect dis 60
Ellipse dis 60
Felix dis 60
Richard dis 60
Lane's Steel Anti-Friction dis 60
The Ball Bearing Door Hanger dis 60
Warner's Patent dis 60
Stearns' Anti-Friction dis 60
Stearns' Challenge dis 60
Faulstich dis 60
American dis 60
Rider & Wood, No. 1, 6.50; No. 2, 7.50 dis 60
Paragon, No. 5, 6.4; 7 and 8 dis 60
Crescent dis 60
Nickel Cast Iron dis 60
Nickel, Malleable Iron and Steel dis 60
Scranton Anti Friction Single Strap dis 60
Screen on Anti Friction Double Strap dis 60
Universal Anti Friction dis 60
Wild West, 4 in. wheel, 15; 5 in. wheel, 21 dis 60
Star dis 60
May dis 60
Harnes/Munroe - See Snapa.
Hatchers - List Jan 1, 1888.
Hatchers dis 60
Hunt's Shingling Lath and Claw dis 60
Hunt's Broad dis 60
Buffalo Hammer Co. dis 60
Hurd's dis 60
Fayette R. Plumb dis 60
Wm. Mann, Jr., & Co. dis 60
Underhill Edge Tool Co. dis 60
Underhill's Haines and Bright goods dis 60
C. Hammond & Son dis 60
Simmons dis 60
Peck's dis 60
Kelly's dis 60
Sargent & Co. dis 60
Ten Eyck Edge Tool Co. dis 60
Collins, following list dis 60
Shingling, Nos. 123 dis 60
Claw, Nos. 123 dis 60
Lathing, Nos. 123 dis 60
Hay Knives dis 60
Lighting dis 60
Electric dis 60
Gem dis 60
Wadsworth's dis 60
Carter's Needle dis 60
Heath's dis 60
Hinges dis 60
Wrought Iron Hinges -
Strap and T dis 60
Screw Hook and Eye dis 60
Strap dis 60
Heavy Welded Hook dis 60
Screw Hook and Eye dis 60
Rolled Blind Hinges, Nos. 22 and 24 dis 60
Rolled Blind Hinges, Nos. 22 and 24 dis 60
Rolled Plate dis 60
Rolled Raised dis 60
Plate Hinges, 8, 10 and 12 in. dis 60
"Providence" over 12 in. dis 60
Spring Hinges dis 60
Geer's Spring and Blank Butts dis 60
Union Spring Hinge Co.'s list, March, 1888 dis 60
Acme and U. S. dis 60
Empire and Crown dis 60
Hero and Mowbray dis 60
American, German and Star, Japanned dis 60
American, German and Star, Bronzed dis 60
Oxford, Bronze and Brass dis 60
Barker's Double Acting dis 60
Union Mfg. Co. dis 60
Bommer's dis 60
Buckman's dis 60
Chicago dis 60
Gate Hinges dis 60
Western dis 60
N. E. dis 60
N. K. Reversible dis 60
Clark's, Nos. 123 dis 60
N. Y. State dis 60
Common Hinges dis 60
Seymour's dis 60
Shepard's dis 60
Reed's Latch and Hinges dis 60
Steel Hinges -
Parker dis 60
Palmer dis 60
Seymour dis 60
Nicholson dis 60
Huffer dis 60
Clark's, Nos. 1, 2, 3, 4 and 50 dis 60
Clark's Mortise Gravity dis 60
Sargent's, Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13 dis 60
Sargent's No. 12 dis 60
Reading's Gravity dis 60
Shepard's "Notchless" No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100 dis 60
Steamboat, Clark's Old Pattern and Clark's Tip Pattern dis 60
Shepard's O. S., Lull & Porter dis 60
Shepard's Acme, Lull & Porter dis 60
Shepard's Queen City Reversible dis 60
Clark's Lull & Porter, Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100 dis 60
North's Automatic Blind Fixtures, No. 2, for Wood, 10.50; No. 3, for Brick, 13.50 dis 60
Hinges dis 60
Garden, Mortar, &c. dis 60
Planter's, Cotton, &c. dis 60
Warren Hoe dis 60
Magic dis 60
D. & H. Scott dis 60
Lane's Crescent Scovill Pattern dis 60
Lane's Crescent Planter's Pattern dis 60
Lane's Razor Blade Scovill Pattern dis 60
Maynard dis 60
Sandusky Tool Co. dis 60
Hubbard & Co. dis 60
Bare dis 60
Grab dis 60
Hinges and Hangers dis 60
Hill's Improved Ringers dis 60
Hill's Old Style Ringers dis 60
Hill's Tongue dis 60
Hill's Rings dis 60

Perfect Rings dis 60
Blair's Rings dis 60
Blair's Rings dis 60
Champion Ringers dis 60
Champion Ringers, Double dis 60
Brown's Ringers dis 60
Brown's Ringers dis 60
Hoisting Apparatus dis 60
"Moore's" Hand Hoist, with Lock Brake dis 60
"Moore's" Differential Pulley Block dis 60
Holders, File and Tool dis 60
Rais Pat dis 60
Nicholson File Holders dis 60
Hollow-Ware dis 60
Stove Hollow-Ware, Ground, dis 60
Stove Hollow-Ware, Unground, dis 60
Enameled and Tinned Hollow-Ware dis 60
Kettles dis 60
Oval Boilers, Saucepans & Glue Pots dis 60
Gray Enameled Ware dis 60
Acute and Granite Ware dis 60
Rustless Hollow-Ware dis 60
Galvanized Steel Kettles dis 60
Inch dis 60
Each dis 60
Silver Plated - 4 mo. or 5 x cash in 30 days dis 60
Reed & Barton dis 60
Meriden Britannia Co. dis 60
Simpson, Hall, Miller & Co. dis 60
Rogers & Brother dis 60
Hartford Silver Plate Co. dis 60
William Rogers Mfg. Co. dis 60
Hoses dis 60
C. H. Iron -
Bird Case, Reading, dis 60
Bird Case, Reading, dis 60
Clothes Line, Sargent's list, dis 60
Clothes Line, Reading list, dis 60
Clothing, Sargent's list, dis 60
Harness, Reading list, dis 60
Coat and Hat, Sargent's list, dis 60
Coat and Hat, Reading, dis 60
Cotton dis 60
Cotton Pat. (N. Y. Mallet & Handle Works) dis 60
Tassel and Picture (T. & S. Mfg. Co.) dis 60
Wrought Staples, Hooks, &c. See Wrought Goods
Bench Hooks dis 60
Wire dis 60
Wire Coat and Hat, Gem, list April, 1888 dis 60
Wire Coat and Hat, Mifflin, list April, 1888 dis 60
Wire Coat and Hat, Standard dis 60
Wire Coat and Hat, Standard dis 60
Belt dis 60
Grass dis 60
Whitcomb-Patent dis 60
Hooks and Eyes - Malleable Iron dis 60
Hooks and Eyes - Steel dis 60
Fish Hooks, American dis 60
Horse Nails dis 60
Anasable dis 60
Clinton, Fin. 344 236 246 256 266 276 286 296 306 316 326 336 346 356 366 376 386 396 406 416 426 436 446 456 466 476 486 496 506 516 526 536 546 556 566 576 586 596 606 616 626 636 646 656 666 676 686 696 706 716 726 736 746 756 766 776 786 796 806 816 826 836 846 856 866 876 886 896 906 916 926 936 946 956 966 976 986 996 1006 dis 60
Essex dis 60
Lyra dis 60
Snowden dis 60
Futnam dis 60
Vulcan dis 60
Northwestern dis 60
Globe dis 60
A. C. dis 60
C. B. K. dis 60
Champion dis 60
New Haven dis 60
Saranac dis 60
Champion dis 60
Capwell dis 60
Star dis 60
Anchor dis 60
Western dis 60
Empire Bronzed dis 60
Horse Shoes - See Shoes, Horse dis 60
Hesse, Rubber competition, 75x10 & 75x10x5 dis 60
Extra dis 60
N. Y. B. & P. Co. Para dis 60
N. Y. B. & P. Co. Extra dis 60
N. Y. B. & P. Co. Dundee dis 60
Huskers dis 60
Blair's Adjustable dis 60
Blair's Adjustable Clipper dis 60
Ice Picks, Chisels, &c. dis 60
National Ice Chisel dis 60
Noyes' Ice Breakers dis 60
Dunlap's Ring Picks dis 60
Wood Head Picks, Sargent's dis 60
Iron Head Picks, Sargent's dis 60
Ice Mallets, Pick in handle dis 60
Ice Cast, Small Cast, No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100 dis 60
Combination Ice Tools, Nail dis 60
Acme Ice Pick and Tongue dis 60
Roger's Lightning Ice Chisel dis 60
Ice Tongs dis 60
Champion, S. B. & Co. dis 60
Family dis 60
Jack Screws - See Screws dis 60
Kettles dis 60
Brass larger than 17 inches, dis 60
Enameled and Tea Kettles dis 60
Keys dis 60
Lock Anso's list Dec. 30, 1888 dis 60
Eagle, Cabinet, Trunk and Padlock dis 60
Hotchkiss' Brass Blanks dis 60
Hotchkiss' Copper and Tinned dis 60
Hotchkiss' Padlock and Cabinet dis 60
Ratchet Bed Keys dis 60
Kofte Manufacturers dis 60
Parkin's Applewood Handles dis 60
Parkin's Rosewood or Cocobolo dis 60
Knives dis 60
Ames' Butcher Knives dis 60
Nichols' Butcher Knives dis 60
Ames' Shoe Knives dis 60
Ames' Bread Knives dis 60
Moran's Shoe and Bread Knives dis 60
Hay and Straw dis 60
Table and Pocket dis 60
Knobs dis 60
Door Mineral dis 60
Door Por. Jap'd dis 60
Door Por. Por. Nickel dis 60
Door Por. Plated, Nickel dis 60
Drawer, Porcelain dis 60
Hammer Door Knobs, new list Dec. 1888 dis 60
Vale & Towne Wood Knobs, list Dec. 1888 dis 60
Furniture Plain dis 60
Furniture, Wood Screws dis 60
Base, Rubber Tip dis 60
Picture, Judd's dis 60
Picture, Sargent's dis 60
Picture, Hemetite dis 60
Shutter, Porcelain dis 60
Carriage, Japanned dis 60

Ladies dis 60
Melting, Sargent's dis 60
Melting, Reading dis 60
Melting, Monroe's Patent dis 60
Melting, P. S. & W. dis 60
Melting, Warner's dis 60
Lawn Mowers dis 60
Standard List dis 60
Enterprise dis 60
Lanterns dis 60
Rubular, Plain with Guards dis 60
Rubular, Lift Wire, with Guards dis 60
Rubular, Square Plain, with Guards dis 60
Rubular, Sq. Lift Wire, with Guards dis 60
Without Guards, 25¢ dozen less dis 60
Police, Small, \$5.00; Med. \$7.25; Large, \$9.75, dis 60
Lemon Squeezers dis 60
Porcelain Lined, No. 1 dis 60
Wood, No. 2 dis 60
Wood, Common dis 60
Dunlap's Improved dis 60
Sammis' No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100 dis 60
Jennings' "Star" dis 60
Dean's dis 60
Little Giant dis 60
King dis 60
Lines dis 60
Cotton and Linen Fish, Draper's dis 60
Draper's Chalk dis 60
Draper's Mason's Linen, 84 ft., No. 1, 1.25; No. 2, 1.75; No. 3, 2.25; No. 4, 2.75; No. 5, 3.25; No. 6, 3.75; No. 7, 4.25; No. 8, 4.75; No. 9, 5.25; No. 10, 5.75; No. 11, 6.25; No. 12, 6.75; No. 13, 7.25; No. 14, 7.75; No. 15, 8.25; No. 16, 8.75; No. 17, 9.25; No. 18, 9.75; No. 19, 10.25; No. 20, 10.75; No. 21, 11.25; No. 22, 11.75; No. 23, 12.25; No. 24, 12.75; No. 25, 13.25; No. 26, 13.75; No. 27, 14.25; No. 28, 14.75; No. 29, 15.25; No. 30, 15.75; No. 31, 16.25; No. 32, 16.75; No. 33, 17.25; No. 34, 17.75; No. 35, 18.25; No. 36, 18.75; No. 37, 19.25; No. 38, 19.75; No. 39, 20.25; No. 40, 20.75; No. 41, 21.25; No. 42, 21.75; No. 43, 22.25; No. 44, 22.75; No. 45, 23.25; No. 46, 23.75; No. 47, 24.25; No. 48, 24.75; No. 49, 25.25; No. 50, 25.75; No. 51, 26.25; No. 52, 26.75; No. 53, 27.25; No. 54, 27.75; No. 55, 28.25; No. 56, 28.75; No. 57, 29.25; No. 58, 29.75; No. 59, 30.25; No. 60, 30.75; No. 61, 31.25; No. 62, 31.75; No. 63, 32.25; No. 64, 32.75; No. 65, 33.25; No. 66, 33.75; No. 67, 34.25; No. 68, 34.75; No. 69, 35.25; No. 70, 35.75; No. 71, 36.25; No. 72, 36.75; No. 73, 37.25; No. 74, 37.75; No. 75, 38.25; No. 76, 38.75; No. 77, 39.25; No. 78, 39.75; No. 79, 40.25; No. 80, 40.75; No. 81, 41.25; No. 82, 41.75; No. 83, 42.25; No. 84, 42.75; No. 85, 43.25; No. 86, 43.75; No. 87, 44.25; No. 88, 44.75; No. 89, 45.25; No. 90, 45.75; No. 91, 46.25; No. 92, 46.75; No. 93, 47.25; No. 94, 47.75; No. 95, 48.25; No. 96, 48.75; No. 97, 49.25; No. 98, 49.75; No. 99, 50.25; No. 100, 50.75 dis 60
Jennings' "Star" dis 60
Dean's dis 60
Little Giant dis 60
King dis 60
Locks, Padlocks, Cabinet Locks, &c. dis 60
Door Locks, Latches, &c. dis 60
List, Dec. 30, '86, chgd Feb. 2, '87, dis 60
Note - Lower net prices often made dis 60
Mallory, Wheeler Co., list July, 1888, dis 60
Sargent & Co., list Aug. 1, 1888, dis 60
Reading Hardware Co., list Feb. 3, '88, dis 60
Livingston & Co. dis 60
Perkins' Burglar Proof dis 60
Plate dis 60
F. Many's "Extension Cylinder" dis 60
Barnes Mfg. Co. dis 60
Yale Corrugated Key dis 60
Yale Key dis 60
L. & C. Round Key Latches dis 60
L. & C. Flat Key Latches dis 60
Romer's Night Latches dis 60
Yale new list dis 60
"Shepardson" or "U. S." dis 60
"Felter" or "American" dis 60
Seed's N. Y. Hasp Lock dis 60
Cabinets dis 60
Eagle, Gaylord Parker and } List March, '84, revised
Corbin, } Jan. 1, '84, dis 60
Deits, Nos. 36 to 62 dis 60
Deits, Nos. 51 to 62 dis 60
Deits, Nos. 63 to 98 dis 60
Stoddard Lock Co. dis 60
"Champion" Night Latches dis 60
Barnes Mfg. Co. dis 60
Eagle and Corbin Trunk dis 60
"Champion" Cabinet and Combination dis 60
Yale dis 60
Romer's dis 60
List, Dec. 23, '84 dis 60
Yale Lock Mfg. Co. dis 60
Eagle dis 60
Sureka, Eagle Lock Co. dis 60
Romer's, Nos. 0 to 51 dis 60
Romer's Scandinavian, &c., Nos. 100 to 505 dis 60
"Champion" Padlocks dis 60
"Star" dis 60
"Horse Shoe" dis 60
Barnes Mfg. Co. dis 60
Nock's dis 60
Brown's Patent dis 60
Scandinavian dis 60
"Rain's" Pat. Scandinavian new list (Nov.) dis 60
Lumber Teels dis 60
Sling Peavies, "Blue Line" Finish dis 60
Sling Peavies, Common Finish dis 60
Steel Socket Peavies dis 60
Wall, Iron Socket Peavies dis 60
Cant Hooks, "Blue Line" Finish dis 60
Cant Hooks, Common Finish dis 60
Cant Hooks, Nail, Socket Clasp, "Blue Line" Finish dis 60
Cant Hooks, Nail, Socket Clasp Common Finish dis 60
Cant Hooks, Clip Clasp, "Blue Line" Fin. dis 60
Cant Hooks, Clip Clasp, Common Finish dis 60
Hand Spikes dis 60
Pike Poles, Pike & Hook, 12 ft. 14 ft. 16 ft. 18 ft. 20 ft. dis 60
Pike Poles, Pike only, 10.00 11.00 12.00 13.00 14.00 15.00 16.00 17.00 18.00 19.00 20.00 dis 60
Pike Poles, not ironed, 6.00 7.00 8.00 9.00 10.00 11.00 12.00 13.00 14.00 15.00 16.00 17.00 18.00 19.00 20.00 dis 60
Setting Poles, 14.00 15.00 16.00 17.00 dis 60
Wamp Hooks dis 60
Landing Blocks dis 60
Sliding Doors dis 60
Log Bins dis 60
Sanded Boot Calks, 1 to 5 M, dis 25; 5 to 10 M, dis 30 dis 60
Square Steel Boot Calks dis 60
Chain Rattling Dogs dis 60
Ring Rattling Dogs, 100, med., \$10.00; large, \$12.00 dis 60
Timber Grapples dis 60
Lustrate dis 60
Four-ounce Bottles dis 60
Mallets dis 60
Hickory dis 60
Gumvites dis 60
B. & L. Block Co., Hickory and L. V. dis 60
Match Safes dis 60
Dangerfield's Self-Igniting dis 60
Mattresses - Regular list dis 60
Meat Cutters dis 60
Dixon's - Nos. 1 2 3 4 dis 60
Woodruff's dis 60
Champion dis 60
Hales' Pattern Nos. 11 12 13 dis 60
American dis 60
Enterprise dis 60

Pennsylvania.....dis 40&105
Nos. 1 2 3 4 5 6 7 8 9 10
dos. \$24.00 28.00 32.00 36.00 40.00 44.00 48.00 52.00 56.00 60.00
Miles' Challenge, Nos. 1 2 3 4 5 6 7 8 9 10
dos. \$24.00 28.00 32.00 36.00 40.00 44.00 48.00 52.00 56.00 60.00
Home No. 1.....dis 45&105
Draw Cut, Nos. 1 2 3 4 5 6 7 8 9 10
dos. \$24.00 28.00 32.00 36.00 40.00 44.00 48.00 52.00 56.00 60.00
Beef Shavers Enterprise Mfg. Co., dis 20 @ 25
Chadborn's Smoked Beef Cutter.....# dos. \$85.00
Mining Knives.
Am. (3d quality), # gro. 1 blade, \$7; 2 blades, \$12; 3 blades, \$18.
Lothrop's, # dos. Single, \$2.00; Double, \$3.00; dis 20 @ 25
Knapp & Cowles, # dis 60 @ 100
Buffalo Adjustable.....# dos \$3.00, dis 25 %
Melanese Gates—Stebbins Pat., dis 70 @ 70 & 75
Stebbins' Genuine.....dis 60 @ 100
Stebbins' Tinned Ends.....dis 40 @ 10
Chase's Hard Metal.....dis 20 @ 10
Stebbins' Pattern.....dis 70 @ 70 & 75
Wood's.....dis 20 @ 10
Boss Nos. 1 2 3 4 5 6 7 8 9 10
dos. \$7.00 8.00 9.00 10.00 11.00 12.00 13.00 14.00 15.00 16.00
Money Drawers.....# dos. \$15 @ \$20
Muzzles—Safety, # dos. \$3.....dis 25 %
Nails.
See Trade Report
Wire Nails, Standard Penny.....# keg, \$2.60 @ \$2.70
Nail Puller—Curtis Hammer.....# dos \$2.00, dis 10 %
Pelican.....# dos \$2.00, dis 25 %
Boss.....# dos \$3.00, dis 30 %
Nail Nuts—Square.....# gro. \$4.00 @ \$4.25
Round.....# gro. \$3.25
Cannon's Diamond Point.....# gro. \$12 @ 20 %
Nut Crackers.
Table (Hudson & Beckley Mfg. Co.).....dis 40 %
Blake's Pattern.....# dos \$2.00, dis 10 %
Turner & Seymour Mfg. Co.....dis 50 %
Nuts.
All kinds, 5/16 off list Jan. 1, 1888.
In lots less than 100 lb, # b, add 1/4, 1 lb boxes add 1/2 to list.
Oakum.
Government.....# b \$6
U. S. Navy.....# b \$7
Navy.....# b \$6
Oilers—Zinc and Tin.....dis 65 @ 65 & 10
Saws and Copper.....dis 60 @ 100 & 105
Valuable, Hammer, Improved, No 1, \$3.00; No. 2, \$4.00; No. 3, \$4.40; dis 10 @ 10 & 15
Valuable, Hammers, Old Pattern, same list, dis 40 %
Prior's Patent or "Paragon" Zinc.....dis 60 @ 100 & 105
Prior's Patent or "Paragon" Brass.....dis 50 %
Olmstead's Tin and Zinc.....dis 60 %
Olmstead's Brass and Copper.....dis 60 %
Broughton's Zinc.....dis 60 %
Broughton's Brass.....dis 60 %
Packing, Steam.
Rubber—
Standard.....dis 60 @ 10 @ 60 @ 100 & 105
Extra.....dis 60 @ 10 @ 60 @ 100 & 105
N. Y. B. & P. Co., Standard.....dis 60 @ 100 & 105
N. Y. B. & P. Co., Empire.....dis 70 %
N. Y. B. & P. Co., Salamander.....# b \$5, dis 80 %
Jenkins' Standard.....# b \$6, dis 85 %
Miscellaneous.
American Packing.....10 @ 11 @ 12 @ 13 @ 14 @ 15 @ 16 @ 17 @ 18 @ 19 @ 20
Russia Packing.....14 @ 15 @ 16 @ 17 @ 18 @ 19 @ 20
Cotton Packing.....15 @ 16 @ 17 @ 18 @ 19 @ 20
Jute.....7 @ 8 @ 9 @ 10 @ 11 @ 12 @ 13 @ 14 @ 15 @ 16 @ 17 @ 18 @ 19 @ 20
Padilocks—See Locks.
Pails.
Sawdust Iron—
Quartz.....10 12 14
Hill's Light Weight, # dos.....\$2.75 3.00 3.25 3.50
Hill's Heavy Weight, # dos.....3.00 3.25 3.75
Whiting's.....2.75 3.00 3.25
Sidney Shepard & Co.....2.67 3.00 3.25
Iron Clad.....2.75 3.00 3.25
Fire Buckets.....2.75 3.25 3.50
Buckets, See Wall Buckets
Indurated Fibre Ware—
Star Pail, 12 qt.....# dos \$4.50
Fire Stable and Milk, 14 qt.....# dos \$5.50
Fenella's Faber's Carpenters.....high list, dis 60 %
Abner's Round Gilt.....# gro \$5.25 net
Dixon's Lead.....# gro \$4.50 net
Dixon's.....# gro \$7.75 net
Dixon's Carpenters.....dis 40 @ 10 %
Flocks.
Railroad, 5 to 6, \$12.00; 6 to 7, \$13. dis 60 @ 100 @ 125 & 150
Adze Eye, 5 to 6, \$12.00; 6 to 7, \$13. dis 60 @ 100 @ 125 & 150
Picture Nails.
Brass Head, Sargent's Pat., dis 60 @ 100 & 105
Brass Head, Combination list.....dis 60 @ 100 & 105
Porcelain Head, Sargent's list.....dis 60 @ 100 & 105
Porcelain Head, Combination list.....dis 60 @ 100 & 105
Miles' Patent.....dis 40 %
Plating Irons.....# dos 65 net
Pipe, Wrought Iron—List March 23, 1887.
1 1/2 and under, Plain.....dis 55 %
1 1/2 and under, Galvanized.....dis 47 %
1 1/2 and over, Plain.....dis 65 %
1 1/2 and over, Galvanized.....dis 55 %
Boiler Tubes, Iron.....dis 65 %
Planes and Plane Irons.
Wood Planes—
Moulding.....dis 50 @ 10 @ 60 @ 100 & 105
Bench, First Quality.....dis 60 @ 100 & 105
Bench, Second Quality.....dis 60 @ 100 & 105
Bailey's (Stanley R. & L. Co.).....dis 30 @ 10 %
Iron Planes—
Bailey's (Stanley R. & L. Co.).....dis 30 @ 100 @ 300 @ 1000 & 1005
Miscellaneous Planes (Stanley R. & L. Co.).....dis 20 @ 10 %
Victor Planes (Stanley R. & L. Co.).....dis 20 @ 10 %
Steel's Iron Planes.....dis 35 @ 60 & 100
Meriden Mal. Iron Co.'s.....dis 30 @ 100 @ 300 @ 1000 & 1005
Davis's Iron Planes.....dis 30 @ 100 @ 300 @ 1000 & 1005
Birmingham Plane Co.....dis 50 @ 60 & 100
Gage Tool Co.'s Self Setting.....dis 40 @ 5 %
Chaplin's Iron Planes.....dis 30 @ 10 @ 300 @ 1000 & 1005
Sargent's.....dis 30 @ 10 @ 300 @ 1000 & 1005
Plane Irons—
Plane Irons, Butcher's.....\$5.00 @ \$5.25 to 2
Plane Irons, Buck Bros.....dis 30 %
Plane Irons, Auburn Tool Co., "Thistle".....dis 40 %
Plane Irons, Middlesex Mfg. Co., "Baldwin Iron," Single and Cut.....dis 20 @ 25
Double.....dis 30 @ 25
1 & 1/2, White.....dis 25 %
Pliers and Nippers.....dis 30 @ 10 @ 40 %
Hill's Pat. Compound Lever Cutting Nippers, No. 2, 5 in., \$13.50; No. 4, 7 in., \$21.00; # dos dis 20 @ 100 @ 300 & 1000
Hudson & Beckley Mfg. Co.....dis 60 @ 100 & 105

Gas Pliers.....dis 60 %
Gas Pliers, Custer's Nickel Plated.....dis 60 @ 5
Eureka Pliers and Nippers.....dis 40 %
Russell's Parallel.....dis 25 %
P. S. & W. Tinner's Cutting Nippers.....dis 50 %
Carew's Pat. Wire Cutters.....dis 20 %
Morrill's Parallel, per doz., \$12.....dis 30 @ 5
Crown's 5 in., \$15; 10 in., \$21.....dis 40 @ 40 & 5
Plumb and Levels.
Regular List.....dis 70 @ 100 @ 70 @ 100 & 105
Dixon's.....dis 45 @ 10 %
Pocket Levels.....dis 70 @ 100 @ 70 @ 100 & 105
Davis' Iron Levels.....dis 30 %
Davis' Inclinoimeters.....dis 10 @ 10 %
Peppers, Corn.
Round or Square, 1 qt.....# gro \$12 @ \$15
Round or Square, 2 qt.....# gro \$25 @ \$26
Post Hole and Tree Augers and Diggers.
Samson Post Hole Digger.....# dos \$36.00, dis 25 @ 10 %
Fletcher Post Hole Augers.....# dos \$36.00, dis 20 %
Eureka Diggers.....# dos \$16 @ \$17
Leed's.....# dos \$8.00 @ \$9.00
Faulstich's Double Auger, per doz.....\$13 @ \$14.00
Kohler's Little Giant.....# dos \$18.00
Kohler's Hercules.....# dos \$15.00
Kohler's New Champion.....# dos \$9.00
Schneider.....# dos \$18
Ryan's Post Hole Diggers.....# dos \$24
Crown's Post Bars.....# dos \$60, dis 50 @ 50 & 10 %
Gibb's Post Hole Digger, # dos \$30, dis 40 @ 40 & 10 %
Potato Parsers.
White Mountain.....# dos \$5.00 @ \$5.50
Antrim Combination.....# dos \$8.00
Hoodler.....# dos \$13.50
Pruning Hooks and Shears.
Dixon's Combined Pruning Hook and Saw, # dos \$18.00, dis 20 @ 10 %
Olson's Pruning Hook.....# dos \$12.00, dis 20 @ 10 %
S. S. Lee & Co.'s Pruning Tools.....dis 40 %
Pruning Shears, Henry - Pat.....# dos \$3.75 @ \$4.00 net
Wheeler, M. & Co.'s Combination.....# dos \$12 @ 20 %
Dunlap's Saw and Chisel.....# dos \$2.50, dis 30 %
J. Mallinson & Co.....No. 1, \$5.25; No. 2, \$7.25
Palleys—Hot House, Awning, &c.....dis 60 @ 10 %
Japanned Screw.....dis 60 @ 10 %
Brass Screw.....dis 60 @ 10 %
Japanned Side.....dis 60 @ 10 %
Japanned Clothes Line.....dis 60 @ 10 %
Knapp's Saw Pulley.....dis 55 @ 60 %
Moore's Sash, Anti Friction.....dis 50 %
Hay Fork, Solid Eye, \$4.00; Swivel, \$4.50 (dis 60 @ 10 %
Hay Fork, "Anti Friction," 5 in. Solid, \$6.70.....dis 50 %
Hay Fork, "F" Common and Pat. Bushed.....dis 20 %
Hay Fork, Tarbox Pat. Iron.....dis 60 %
Hay Fork, Reed's Self-Lubricating.....dis 45 %
Shade Rack.....dis 45 %
Tackle Blocks.....See Blocks
Punches—
Clatern, Best Makers.....dis 50 @ 100 & 100
Pitcher about, Best Makers.....dis 60 @ 100 @ 100 & 105
Pitcher about, Cheap Goods.....dis 70 @ 70 @ 100 & 105
Punches.
Saddlers' or Drive, good quality.....# dos 60 @ 65
Bemis & Call Co.'s Cast Steel Drive.....dis 50 @ 55
Bemis & Call Co.'s Spring Steel Drive.....dis 50 @ 55
Spring, good quality.....# dos \$2.50 @ \$2.60
Spring, Leach's Patent.....dis 15 %
Bemis & Call Co.'s Spring and Check.....dis 40 %
Solid Tinner's.....# dos \$1.44, dis 55 %
Tinner's Hollow Punches.....dis 40 @ 2
Rice Hand Punches.....dis 15 %
Rail.
Sliding Door, Wrt. Brass, # b \$54.....dis 15 %
Sliding Door, Bronzed Wrt. Iron.....# foot 75
Sliding Door, Painted.....# foot 45, dis 60 @ 100 & 105
eary Door, Light.....# foot 100, \$2.50 2.00 4.00 10-15
b for N. E. Hangers—
Small Med. Large
Per 100 feet.....\$3.15 2.70 3.25 net
Terry's Wrought Iron, # foot.....45 @ 65
Victor Steel Rail, 7 1/2 ft.....dis 50 @ 2
Carrier Steel Rail, per foot.....45 @ 65
Saws.
Cast steel.....dis 65 @ 70 %
Manila.....dis 70 @ 75 %
Gibbs Lawn Rake.....dis 40 %
Canton Lawn Rake.....dis 40 %
Ft. Madison Prize Bow Brace and Peeries.....dis 65 @ 5
Fort Madison Steel Tooth Lawn Rake, \$5.....dis 25 %
Razors—J. R. Torrey Razor Co.....dis 20 %
Wootenholme and Butcher.....\$10 to \$2, dis 10 %
Razor Straps.
Genuine Emerson.....dis 60 @ 60 & 65
Imitation Emerson.....# dos \$5.00, dis 60 @ 100 & 105
Torrey's.....dis 20 %
Badger's Belt and Combination.....dis 20 %
Lamont Combination.....# dos \$4
Rivets and Burrs.
Copper.....dis 50 @ 60 @ 10 %
Iron, list November 17, 1887.....dis 50 @ 60 & 75 %
Rivet Sets.....dis 50 @ 2 @ 60 @ 10 %
Rods—Star, Brass.....dis 50 @ 2
Star Black Walnut.....# dos 40 %
Rollers.
Barn Door, Sargent's list.....dis 60 @ 100 @ 100 & 105
Acme (Anti-Friction).....dis 65 %
Union Barn Door Roller.....dis 70 %
Ropes—Manufacturers' prices for large lots.
Manila.....1/4 inch and larger # b 11 1/2 @ net
Manila.....1/2 inch # b 12 @ net
Manila.....3/4 inch # b 12 1/2 @ net
Manila Tarred Rope.....# b 11 @ net
Manila, Hay Rope.....# b 11 1/2 @ net
Sisal.....1/4 inch and larger # b 9 1/2 @ net
Sisal.....1/2 inch # b 10 1/2 @ net
Sisal, Hay Rope.....# b 9 1/2 @ net
Sisal, Tarred Rope.....# b 9 1/2 @ net
Sisal, Medium Lath Yarn.....# b 8 1/2 @ net
Cotton Rope.....# b 15 @ 15 @ net
Jute Rope.....# b 7 @ net
Rules.
Boxwood.....dis 80 @ 10 @ 80 @ 100 & 105
Horn.....dis 50 @ 50 @ 100 & 105
Starrett's Rules and Straight Edges, Steel, dis 25 @ 10 %
b from 10 to 10, at factory.....\$100 @ \$2.40 @ \$2.55
Self Heating.....# dos \$9.00 net
Self Heating, Tailors'.....# dos \$18.00 net
Gleason's Shield and Toller.....dis 25 %
Mrs. Pott's Irons.....dis 40 @ 100 & 105
Enterprise Star Irons, new list, July 1, 1887.....dis 40 %
Combs and Files and Sash Iron.....# dos \$15.00, dis 15 %
Fox Reversible, Self Fluter.....# dos \$24.00 net
Chinese Laundry (N. E. Butt Co.).....dis 15 %
New England.....dis 15 %
Mehony's Troy Pol. Irons.....dis 25 %
Sensible.....dis 20 @ 20 & 25 %
Sane and Emery Paper and Cloth.
List April 19, 1888.....dis 20 @ 20 & 25 %
Sibley, Emery and Crocus Cloth.....dis 30 %
Sash Cord.
Common.....# b 10 @ 11 @ net
Patent, good quality.....# b 15 @ 15 @ net
White Cotton Braided, fair quality.....# b 25 @ 25 @ net
Common Plain Sash.....# b 13 @ 13 @ net

Patent.....# b 15 @ net
Cable Laid Italian.....# b 22 @ 22 @ net
India Cable Laid.....# b 13 @ net
Silver Lake, A Quality, White.....dis 10 @ 100 & 105
Silver Lake, B Quality, White.....dis 10 @ 100 & 105
Silver Lake, C Quality, White.....dis 10 @ 100 & 105
Silver Lake, D Quality, White.....dis 10 @ 100 & 105
Silver Lake, E Quality, White.....dis 10 @ 100 & 105
Silver Lake, F Quality, White.....dis 10 @ 100 & 105
Silver Lake, G Quality, White.....dis 10 @ 100 & 105
Silver Lake, H Quality, White.....dis 10 @ 100 & 105
Silver Lake, I Quality, White.....dis 10 @ 100 & 105
Silver Lake, J Quality, White.....dis 10 @ 100 & 105
Silver Lake, K Quality, White.....dis 10 @ 100 & 105
Silver Lake, L Quality, White.....dis 10 @ 100 & 105
Silver Lake, M Quality, White.....dis 10 @ 100 & 105
Silver Lake, N Quality, White.....dis 10 @ 100 & 105
Silver Lake, O Quality, White.....dis 10 @ 100 & 105
Silver Lake, P Quality, White.....dis 10 @ 100 & 105
Silver Lake, Q Quality, White.....dis 10 @ 100 & 105
Silver Lake, R Quality, White.....dis 10 @ 100 & 105
Silver Lake, S Quality, White.....dis 10 @ 100 & 105
Silver Lake, T Quality, White.....dis 10 @ 100 & 105
Silver Lake, U Quality, White.....dis 10 @ 100 & 105
Silver Lake, V Quality, White.....dis 10 @ 100 & 105
Silver Lake, W Quality, White.....dis 10 @ 100 & 105
Silver Lake, X Quality, White.....dis 10 @ 100 & 105
Silver Lake, Y Quality, White.....dis 10 @ 100 & 105
Silver Lake, Z Quality, White.....dis 10 @ 100 & 105
Silver Lake, AA Quality, White.....dis 10 @ 100 & 105
Silver Lake, AB Quality, White.....dis 10 @ 100 & 105
Silver Lake, AC Quality, White.....dis 10 @ 100 & 105
Silver Lake, AD Quality, White.....dis 10 @ 100 & 105
Silver Lake, AE Quality, White.....dis 10 @ 100 & 105
Silver Lake, AF Quality, White.....dis 10 @ 100 & 105
Silver Lake, AG Quality, White.....dis 10 @ 100 & 105
Silver Lake, AH Quality, White.....dis 10 @ 100 & 105
Silver Lake, AI Quality, White.....dis 10 @ 100 & 105
Silver Lake, AJ Quality, White.....dis 10 @ 100 & 105
Silver Lake, AK Quality, White.....dis 10 @ 100 & 105
Silver Lake, AL Quality, White.....dis 10 @ 100 & 105
Silver Lake, AM Quality, White.....dis 10 @ 100 & 105
Silver Lake, AN Quality, White.....dis 10 @ 100 & 105
Silver Lake, AO Quality, White.....dis 10 @ 100 & 105
Silver Lake, AP Quality, White.....dis 10 @ 100 & 105
Silver Lake, AQ Quality, White.....dis 10 @ 100 & 105
Silver Lake, AR Quality, White.....dis 10 @ 100 & 105
Silver Lake, AS Quality, White.....dis 10 @ 100 & 105
Silver Lake, AT Quality, White.....dis 10 @ 100 & 105
Silver Lake, AU Quality, White.....dis 10 @ 100 & 105
Silver Lake, AV Quality, White.....dis 10 @ 100 & 105
Silver Lake, AW Quality, White.....dis 10 @ 100 & 105
Silver Lake, AX Quality, White.....dis 10 @ 100 & 105
Silver Lake, AY Quality, White.....dis 10 @ 100 & 105
Silver Lake, AZ Quality, White.....dis 10 @ 100 & 105
Silver Lake, BA Quality, White.....dis 10 @ 100 & 105
Silver Lake, BB Quality, White.....dis 10 @ 100 & 105
Silver Lake, BC Quality, White.....dis 10 @ 100 & 105
Silver Lake, BD Quality, White.....dis 10 @ 100 & 105
Silver Lake, BE Quality, White.....dis 10 @ 100 & 105
Silver Lake, BF Quality, White.....dis 10 @ 100 & 105
Silver Lake, BG Quality, White.....dis 10 @ 100 & 105
Silver Lake, BH Quality, White.....dis 10 @ 100 & 105
Silver Lake, BI Quality, White.....dis 10 @ 100 & 105
Silver Lake, BJ Quality, White.....dis 10 @ 100 & 105
Silver Lake, BK Quality, White.....dis 10 @ 100 & 105
Silver Lake, BL Quality, White.....dis 10 @ 100 & 105
Silver Lake, BM Quality, White.....dis 10 @ 100 & 105
Silver Lake, BN Quality, White.....dis 10 @ 100 & 105
Silver Lake, BO Quality, White.....dis 10 @ 100 & 105
Silver Lake, BP Quality, White.....dis 10 @ 100 & 105
Silver Lake, BQ Quality, White.....dis 10 @ 100 & 105
Silver Lake, BR Quality, White.....dis 10 @ 100 & 105
Silver Lake, BS Quality, White.....dis 10 @ 100 & 105
Silver Lake, BT Quality, White.....dis 10 @ 100 & 105
Silver Lake, BU Quality, White.....dis 10 @ 100 & 105
Silver Lake, BV Quality, White.....dis 10 @ 100 & 105
Silver Lake, BW Quality, White.....dis 10 @ 100 & 105
Silver Lake, BX Quality, White.....dis 10 @ 100 & 105
Silver Lake, BY Quality, White.....dis 10 @ 100 & 105
Silver Lake, BZ Quality, White.....dis 10 @ 100 & 105
Silver Lake, CA Quality, White.....dis 10 @ 100 & 105
Silver Lake, CB Quality, White.....dis 10 @ 100 & 105
Silver Lake, CC Quality, White.....dis 10 @ 100 & 105
Silver Lake, CD Quality, White.....dis 10 @ 100 & 105
Silver Lake, CE Quality, White.....dis 10 @ 100 & 105
Silver Lake, CF Quality, White.....dis 10 @ 100 & 105
Silver Lake, CG Quality, White.....dis 10 @ 100 & 105
Silver Lake, CH Quality, White.....dis 10 @ 100 & 105
Silver Lake, CI Quality, White.....dis 10 @ 100 & 105
Silver Lake, CJ Quality, White.....dis 10 @ 100 & 105
Silver Lake, CK Quality, White.....dis 10 @ 100 & 105
Silver Lake, CL Quality, White.....dis 10 @ 100 & 105
Silver Lake, CM Quality, White.....dis 10 @ 100 & 105
Silver Lake, CN Quality, White.....dis 10 @ 100 & 105
Silver Lake, CO Quality, White.....dis 10 @ 100 & 105
Silver Lake, CP Quality, White.....dis 10 @ 100 & 105
Silver Lake, CQ Quality, White.....dis 10 @ 100 & 105
Silver Lake, CR Quality, White.....dis 10 @ 100 & 105
Silver Lake, CS Quality, White.....dis 10 @ 100 & 105
Silver Lake, CT Quality, White.....dis 10 @ 100 & 105
Silver Lake, CU Quality, White.....dis 10 @ 100 & 105
Silver Lake, CV Quality, White.....dis 10 @ 100 & 105
Silver Lake, CW Quality, White.....dis 10 @ 100 & 105
Silver Lake, CX Quality, White.....dis 10 @ 100 & 105
Silver Lake, CY Quality, White.....dis 10 @ 100 & 105
Silver Lake, CZ Quality, White.....dis 10 @ 100 & 105
Silver Lake, DA Quality, White.....dis 10 @ 100 & 105
Silver Lake, DB Quality, White.....dis 10 @ 100 & 105
Silver Lake, DC Quality, White.....dis 10 @ 100 & 105
Silver Lake, DD Quality, White.....dis 10 @ 100 & 105
Silver Lake, DE Quality, White.....dis 10 @ 100 & 105
Silver Lake, DF Quality, White.....dis 10 @ 100 & 105
Silver Lake, DG Quality, White.....dis 10 @ 100 & 105
Silver Lake, DH Quality, White.....dis 10 @ 100 & 105
Silver Lake, DI Quality, White.....dis 10 @ 100 & 105
Silver Lake, DJ Quality, White.....dis 10 @ 100 & 105
Silver Lake, DK Quality, White.....dis 10 @ 100 & 105
Silver Lake, DL Quality, White.....dis 10 @ 100 & 105
Silver Lake, DM Quality, White.....dis 10 @ 100 & 105
Silver Lake, DN Quality, White.....dis 10 @ 100 & 105
Silver Lake, DO Quality, White.....dis 10 @ 100 & 105
Silver Lake, DP Quality, White.....dis 10 @ 100 & 105
Silver Lake, DQ Quality, White.....dis 10 @ 100 & 105
Silver Lake, DR Quality, White.....dis 10 @ 100 & 105
Silver Lake, DS Quality, White.....dis 10 @ 100 & 105
Silver Lake, DT Quality, White.....dis 10 @ 100 & 105
Silver Lake, DU Quality, White.....dis 10 @ 100 & 105
Silver Lake, DV Quality, White.....dis 10 @ 100 & 105
Silver Lake, DW Quality, White.....dis 10 @ 100 & 105
Silver Lake, DX Quality, White.....dis 10 @ 100 & 105
Silver Lake, DY Quality, White.....dis 10 @ 100 & 105
Silver Lake, DZ Quality, White.....dis 10 @ 100 & 105
Silver Lake, EA Quality, White.....dis 10 @ 100 & 105
Silver Lake, EB Quality, White.....dis 10 @ 100 & 105
Silver Lake, EC Quality, White.....dis 10 @ 100 & 105
Silver Lake, ED Quality, White.....dis 10 @ 100 & 105
Silver Lake, EE Quality, White.....dis 10 @ 100 & 105
Silver Lake, EF Quality, White.....dis 10 @ 100 & 105
Silver Lake, EG Quality, White.....dis 10 @ 100 & 105
Silver Lake, EH Quality, White.....dis 10 @ 100 & 105
Silver Lake, EI Quality, White.....dis 10 @ 100 & 105
Silver Lake, EJ Quality, White.....dis 10 @ 100 & 105
Silver Lake, EK Quality, White.....dis 10 @ 100 & 105
Silver Lake, EL Quality, White.....dis 10 @ 100 & 105
Silver Lake, EM Quality, White.....dis 10 @ 100 & 105
Silver Lake, EN Quality, White.....dis 10 @ 100 & 105
Silver Lake, EO Quality, White.....dis 10 @ 100 & 105
Silver Lake, EP Quality, White.....dis 10 @ 100 & 105
Silver Lake, EQ Quality, White.....dis 10 @ 100 & 105
Silver Lake, ER Quality, White.....dis 10 @ 100 & 105
Silver Lake, ES Quality, White.....dis 10 @ 100 & 105
Silver Lake, ET Quality, White.....dis 10 @ 100 & 105
Silver Lake, EU Quality, White.....dis 10 @ 100 & 105
Silver Lake, EV Quality, White.....dis 10 @ 100 & 105
Silver Lake, EW Quality, White.....dis 10 @ 100 & 105
Silver Lake, EX Quality, White.....dis 10 @ 100 & 105
Silver Lake, EY Quality, White.....dis 10 @ 100 & 105
Silver Lake, EZ Quality, White.....dis 10 @ 100 & 105
Silver Lake, FA Quality, White.....dis 10 @ 100 & 105
Silver Lake, FB Quality, White.....dis 10 @ 100 & 105
Silver Lake, FC Quality, White.....dis 10 @ 100 & 105
Silver Lake, FD Quality, White.....dis 10 @ 100 & 105
Silver Lake, FE Quality, White.....dis 10 @ 100 & 105
Silver Lake, FF Quality, White.....dis 10 @ 100 & 105
Silver Lake, FG Quality, White.....dis 10 @ 100 & 105
Silver Lake, FH Quality, White.....dis 10 @ 100 & 105
Silver Lake, FI Quality, White.....dis 10 @ 100 & 105
Silver Lake, FJ Quality, White.....dis 10 @ 100 & 105
Silver Lake, FK Quality, White.....dis 10 @ 100 & 105
Silver Lake, FL Quality, White.....dis 10 @ 100 & 105
Silver Lake, FM Quality, White.....dis 10 @ 100 & 105
Silver Lake, FN Quality, White.....dis 10 @ 100 & 105
Silver Lake, FO Quality, White.....dis 10 @ 100 & 105
Silver Lake, FP Quality, White.....dis 10 @ 100 & 105
Silver Lake, FQ Quality, White.....dis 10 @ 100 & 105
Silver Lake, FR Quality, White.....dis 10 @ 100 & 105
Silver Lake, FS Quality, White.....dis 10 @ 100 & 105
Silver Lake, FT Quality, White.....dis 10 @ 100 & 105
Silver Lake, FU Quality, White.....dis 10 @ 100 & 105
Silver Lake, FV Quality, White.....dis 10 @ 100 & 105
Silver Lake, FW Quality, White.....dis 10 @ 100 & 105
Silver Lake, FX Quality, White.....dis 10 @ 100 & 105
Silver Lake, FY Quality, White.....dis 10 @ 100 & 105
Silver Lake, FZ Quality, White.....dis 10 @ 100 & 105
Silver Lake, GA Quality, White.....dis 10 @ 100 & 105
Silver Lake, GB Quality, White.....dis 10 @ 100 & 105
Silver Lake, GC Quality, White.....dis 10 @ 100 & 105
Silver Lake, GD Quality, White.....dis 10 @ 100 & 105
Silver Lake, GE Quality, White.....dis 10 @ 100 & 105
Silver Lake, GF Quality, White.....dis 10 @ 100 & 105
Silver Lake, GG Quality, White.....dis 10 @ 100 & 105
Silver Lake, GH Quality, White.....dis 10 @ 100 & 105
Silver Lake, GI Quality, White.....dis 10 @ 100 & 105
Silver Lake, GJ Quality, White.....dis 10 @ 100 & 105
Silver Lake, GK Quality, White.....dis 10 @ 100 & 105
Silver Lake, GL Quality, White.....dis 10 @ 100 & 105
Silver Lake, GM Quality, White.....dis 10 @ 100 & 105
Silver Lake, GN Quality, White.....dis 10 @ 100 & 105
Silver Lake, GO Quality, White.....dis 10 @ 100 & 105
Silver Lake, GP Quality, White.....dis 10 @ 100 & 105
Silver Lake, GQ Quality, White.....dis 10 @ 100 & 105
Silver Lake, GR Quality, White.....dis 10 @ 100 & 105
Silver Lake, GS Quality, White.....dis 10 @ 100 & 105
Silver Lake, GT Quality, White.....dis 10 @ 100 & 105
Silver Lake, GU Quality, White.....dis 10 @ 100 & 105
Silver Lake, GV Quality, White.....dis 10 @ 100 & 105
Silver Lake, GW Quality, White.....dis 10 @ 100 & 105
Silver Lake, GX Quality, White.....dis 10 @ 100 & 105
Silver Lake, GY Quality, White.....dis 10 @ 100 & 105
Silver Lake, GZ Quality, White.....dis 10 @ 100 & 105
Silver Lake, HA Quality, White.....dis 10 @ 100 & 105
Silver Lake, HB Quality, White.....dis 10 @ 100 & 105
Silver Lake, HC Quality, White.....dis 10 @ 100 & 105
Silver Lake, HD Quality, White.....dis 10 @ 100 & 105
Silver Lake, HE Quality, White.....dis 10 @ 100 & 105
Silver Lake, HF Quality, White.....dis 10 @ 100 & 105
Silver Lake, HG Quality, White.....dis 10 @ 100 & 105
Silver Lake, HH Quality, White.....dis 10 @ 100 & 105
Silver Lake, HI Quality, White.....dis 10 @ 100 & 105
Silver Lake, HJ Quality, White.....dis 10 @ 100 & 105
Silver Lake, HK Quality, White.....dis 10 @ 100 & 105
Silver Lake, HL Quality, White.....dis 10 @ 100 & 105
Silver Lake, HM Quality, White.....dis 10 @ 100 & 105
Silver Lake, HN Quality, White.....dis 10 @ 100 & 105
Silver Lake, HO Quality, White.....dis 10 @ 100 & 105
Silver Lake, HP Quality, White.....dis 10 @ 100 & 105
Silver Lake, HQ Quality, White.....dis 10 @ 100 & 105
Silver Lake, HR Quality, White.....dis 10 @ 100 & 105
Silver Lake, HS Quality, White.....dis 10 @ 100 & 105
Silver Lake, HT Quality, White.....dis 10 @ 100 & 105
Silver Lake, HU Quality, White.....dis 10 @ 100 & 105
Silver Lake, HV Quality, White.....dis 10 @ 100 & 105
Silver Lake, HW Quality, White.....dis 10 @ 100 & 105
Silver Lake, HX Quality, White.....dis 10 @ 100 & 105
Silver Lake, HY Quality, White.....dis 10 @ 100 & 105
Silver Lake, HZ Quality, White.....dis 10 @ 100 & 105
Silver Lake, IA Quality, White.....dis 10 @ 100 & 105
Silver Lake, IB Quality, White.....dis 10 @ 100 & 105
Silver Lake, IC Quality, White.....dis 10 @ 100 & 105
Silver Lake, ID Quality, White.....dis 10 @ 100 & 105
Silver Lake, IE Quality, White.....dis 10 @ 100 & 105
Silver Lake, IF Quality, White.....dis 10 @ 100 & 105
Silver Lake, IG Quality, White.....dis 10 @ 100 & 105
Silver Lake, IH Quality, White.....dis 10 @ 100 & 105
Silver Lake, II Quality, White.....dis 10 @ 100 & 105
Silver Lake, IJ Quality, White.....dis 10 @ 100 & 105
Silver Lake, IK Quality, White.....dis 10 @ 100 & 105
Silver Lake, IL Quality, White.....dis 10 @ 100 & 105
Silver Lake, IM Quality, White.....dis 10 @ 100 & 105
Silver Lake, IN Quality, White.....dis 10 @ 100 & 105
Silver Lake, IO Quality, White.....dis 10 @ 100 & 105
Silver

Syracuse Screw Driver Bits.....dis 30 & 30 1/2
Screw Driver Bits.....dis 50 & 75
Screw Driver Bits, Parr's.....dis 60 & 75
Fray & Hol. Hde. Sets, No. 3, 112.....dis 25 & 25 1/2
P. D. & Co.'s, all Steel.....dis 50 & 75

Screws
Wood Screws—List, Brass, Jan. 27: Iron, July 1, 1887
Flat Head Iron.....dis 75 & 100
Round Head Iron.....dis 65 & 100
Flat Head Brass.....dis 65 & 100
Round Head Brass.....dis 65 & 100
Flat Head Bronze.....dis 65 & 100
Round Head Bronze.....dis 65 & 100

Nails
Flat Head Iron.....dis 55 & 100
Round Head Iron.....dis 50 & 100
Bench and Hand.....dis 55 & 100
Bench Iron.....dis 55 & 100
Bench Wood, Beech.....dis 55 & 100
Bench Wood, Hickory.....dis 55 & 100
Hand Wood.....dis 55 & 100
Lag, Blunt Point.....dis 75 & 100
Coach and Lag, Blunt Point.....dis 75 & 100
Bed.....dis 55 & 100
Hand Rail, Sargent's.....dis 65 & 100
Hand Rail, Humason, Beckley & Co.'s.....dis 70 & 100
Hand Rail, Am. Screw Co.....dis 75 & 100
Jack Screws, Millers Falls list.....dis 50 & 60
Jack Screws, S. & W.....dis 50 & 60
Jack Screws, Sargent's.....dis 60 & 100
Jack Screws, Stearns.....dis 40 & 60
Borell Saws.....dis 25 & 100
Lester, complete, \$10.00.....dis 25 & 100
Rogers, complete, \$4.00.....dis 25 & 100
Seythe Sheaths.....dis 50 & 100

Shears
American Cast Iron.....dis 75 & 100
Pruning.....dis 25 & 100
Bernard's Lamp Trimmers.....dis 25 & 100
Timbers.....dis 25 & 100
Seymour's, List, Dec. 1881.....dis 60 & 100
Heinsch's, List, Dec. 1881.....dis 60 & 100
Heinsch's Tailor's Shears.....dis 60 & 100
First quality C. S. Trimmers.....dis 60 & 100
Second quality C. S. Trimmers.....dis 60 & 100
Acme Cast Shears.....dis 10 & 100
Diamond Cast Shears.....dis 10 & 100
Clipper.....dis 10 & 100
Victor Cast Shears.....dis 75 & 100
Howe Bros. & Hulbert, Solid Forged Steel.....dis 40 & 100
Cleveland Machine Co. Solid Steel Forged.....dis 70 & 100
Clausen Shear Co. Japanned.....dis 70 & 100
Clausen Shear Co. Nickel, same list.....dis 60 & 100

Shovels
Hiding Door.....dis 50 & 100
M. W. & Co., List July, 1888.....dis 50 & 100
R. & E. list Dec. 18, 1885.....dis 50 & 100
Corbin's list.....dis 50 & 100
Patent Roller, Hatfield's.....dis 75 & 100
Russell's Anti-Friction, list Dec. 18, 1885.....dis 60 & 100
Moore's Anti-Friction.....dis 60 & 100

Shovel
R. & E. list Dec. 18, 1885.....dis 60 & 100
Sargent's list.....dis 60 & 100
Reading list.....dis 60 & 100

Ship Tools
L. & J. White.....dis 20 & 100
Albertson Mfg. Co.....dis 25 & 100
Sheets, Horne, Mule, & Co.

Horse
Burden's, Perkins, Phoenix, at factory.....\$4.00
Add \$1.00 per keg to above prices.

On Wrought
Ton lots.....dis 100
1000 lb lots.....dis 100
Shot—Eastern prices, 2¢ off cash, 5 days.

Drop
Drop, 25 lb.....dis 1.45
Drop, 50 lb.....dis 1.70
Buck and Chilled, 25 lb bag.....dis 1.70
Buck and Chilled, 50 lb bag.....dis 3.00

Shovels and Spades
Acme Shovels, Spades, &c., list Nov. 1, 1885.....dis 20 & 100
Note—Jobbers frequently give 5 & 7 1/2 % extra on above.

Griffith's Black Iron.....dis 50 & 100
Griffith's O. S. Iron.....dis 60 & 100
Griffith's Solid Cast Steel R. R. Goods.....dis 20 & 100
Old Colony (Sanford Fork & Tool Co.).....dis 20 & 100
St. Louis Shovel Co.....dis 20 & 100
Hussey, Bluns & Co.....dis 15 & 25
Hubbard & Co.....dis 20 & 100
Lehigh Mfg. Co.....dis 20 & 100
Payne Pettibone & Son, list January, 1886.....dis 20 & 100
Bemington's (Lowman's Patent).....dis 30 & 100
Rowland's, Black Iron.....dis 50 & 100
Rowland's Steel.....dis 60 & 100

Shovels and Tongs
Iron Head.....dis 50 & 100
Brass Head.....dis 50 & 100
Skeins, Thimble.....dis 75 & 100
Western list.....dis 75 & 100
Columbus Wrt. Steel, list Nov. 1, 1887.....dis 20 & 100
Coldbrook's d. Iron Co.....dis 50 & 100
Utica P. S. T. Skeins.....dis 60 & 100
Utica Turned and Fitted.....dis 35 & 100

Sieves
Buffalo Metallic, S. & Co., new list.....dis 50 & 100
Barber, Flat, 8 in.....dis 30 & 100
Smith's Adjustable Sifters.....dis 30 & 100
Smith's Adjustable Milk Strainer.....dis 30 & 100
Smith's Adjustable F. & C. Strainer.....dis 30 & 100
Steeles, Wooden, 18 in.....dis 30 & 100
Mesh 18, Nested, 700.....dis 30 & 100
Mesh 20, Nested, 700.....dis 30 & 100
Mesh 24, Nested, 700.....dis 30 & 100
Steeles—School, by case.....dis 50 & 100

Snaps, Harness, &c.
Anchor (T. & S. Mfg. Co.).....dis 50 & 100
Fitch's (Bristol).....dis 50 & 100
Hotchkiss.....dis 10 & 100
Andrews.....dis 10 & 100
Sargent's Patent Guarded.....dis 70 & 100
German, new list.....dis 40 & 100
Covert.....dis 50 & 100
Covert, New Patent.....dis 50 & 100
Covert New R. E.....dis 50 & 100
Covert Spring.....dis 50 & 100

Soldering Irons
Covert's Adjustable, list Jan. 1, 1886.....dis 35 & 100
Skeels Shavers.....dis 45 & 100
Wood.....dis 30 & 100
Bailey's (Stanley R. & L. Co.).....dis 40 & 100
Stearns.....dis 30 & 100

Spike Trimmers
Bonney's.....dis 10.00, dis 50 & 100
Stearns.....dis 10.00, dis 50 & 100
Ives, No. 1, \$15.00; No. 2, \$12.00; No. 3, \$10.00; No. 4, \$8.00; No. 5, \$6.00; No. 6, \$4.00; No. 7, \$3.00; No. 8, \$2.00; No. 9, \$1.00; No. 10, \$0.50; No. 11, \$0.25; No. 12, \$0.15; No. 13, \$0.10; No. 14, \$0.05; No. 15, \$0.025; No. 16, \$0.015; No. 17, \$0.01; No. 18, \$0.005; No. 19, \$0.0025; No. 20, \$0.0015; No. 21, \$0.001; No. 22, \$0.0005; No. 23, \$0.00025; No. 24, \$0.00015; No. 25, \$0.0001; No. 26, \$0.00005; No. 27, \$0.000025; No. 28, \$0.000015; No. 29, \$0.00001; No. 30, \$0.000005; No. 31, \$0.0000025; No. 32, \$0.0000015; No. 33, \$0.000001; No. 34, \$0.0000005; No. 35, \$0.00000025; No. 36, \$0.00000015; No. 37, \$0.0000001; No. 38, \$0.00000005; No. 39, \$0.000000025; No. 40, \$0.000000015; No. 41, \$0.00000001; No. 42, \$0.000000005; No. 43, \$0.0000000025; No. 44, \$0.0000000015; No. 45, \$0.000000001; No. 46, \$0.0000000005; No. 47, \$0.00000000025; No. 48, \$0.00000000015; No. 49, \$0.0000000001; No. 50, \$0.00000000005; No. 51, \$0.000000000025; No. 52, \$0.000000000015; 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No. 239, \$0.00025; No. 240, \$0.00015; No.

SEPTEMBER 19, 1888.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market reports.

2	Red Venetian in oil.....	ass't d cans, 11¢ ;	kegs, 12¢
2	Red Indian Dry.	9	@ 12
2	Rose Pink...	10	@

THE IRON AGE

THURSDAY, SEPTEMBER 27, 1888.

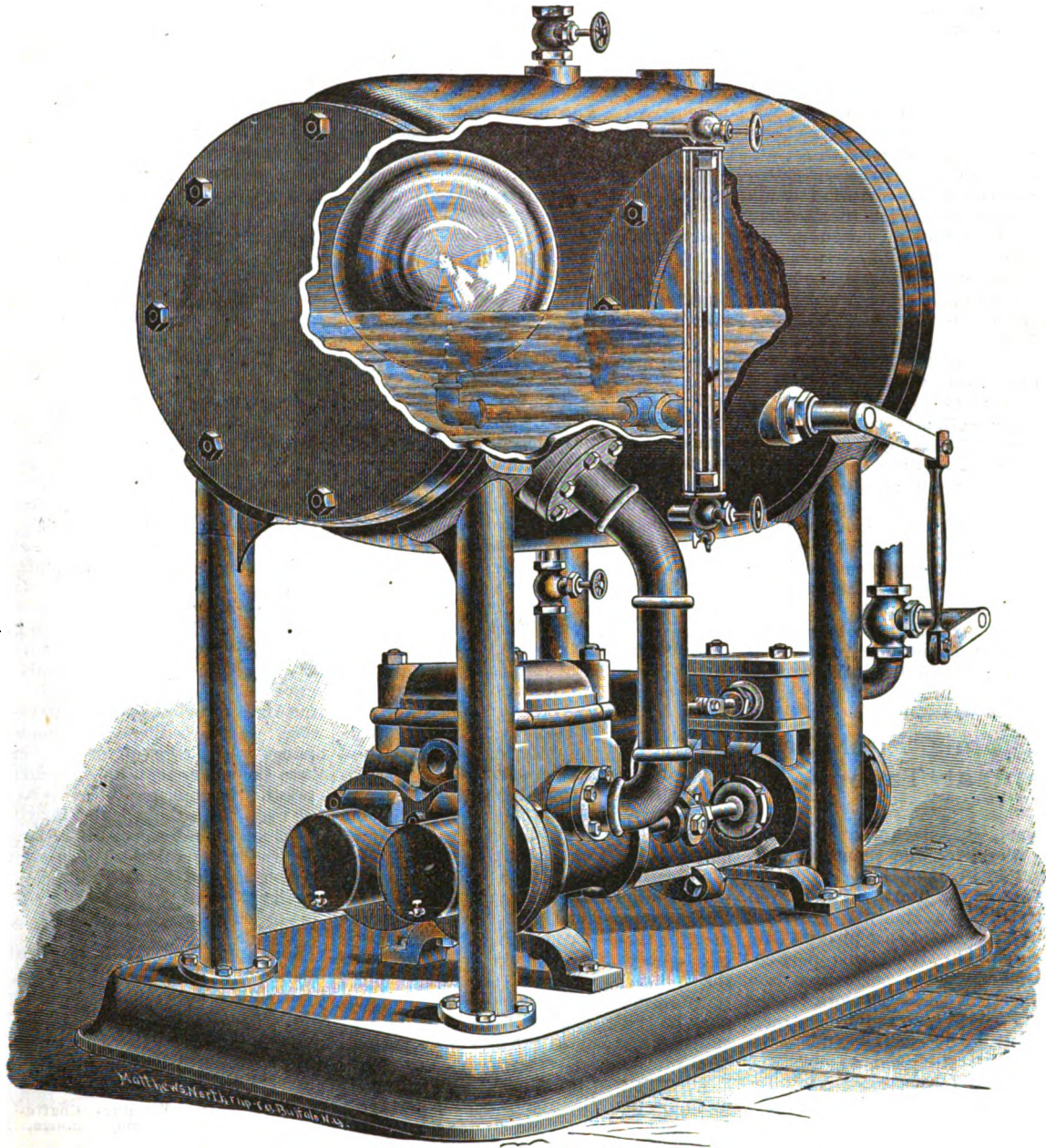
Duplex Pump with Receiving Tank.

We show on this page a duplex pump with receiving tank built by the Volker & Felthousen Mfg. Company, of Buffalo, N. Y., and designed for use in draining radiators, heaters, steam jackets, &c., and feeding the water of condensation direct

The Priestman Petroleum Engine in the United States.

Those of our readers who have more attentively followed the developments in connection with engines other than steam will be interested to know that arrangements are being made for the sale of the

moreover, being a prominent claim made for the Priestman engine. So far as the mechanical details of the engine are concerned, we would refer our readers to a description published in our issue of June 14. We will briefly repeat here, however, that the engine is single-acting, with an explosion at every second revo-



DUPLEX PUMP WITH RECEIVING TANK AND AUTOMATIC ATTACHMENT, BUILT BY THE VOLKER & FELTHOUSEN MFG. COMPANY, BUFFALO, N. Y.

to the steam boiler. It does away with the expense and annoyance of traps and returns the condensed steam to the boiler as fast as it accumulates in the receiver above the pump. The variation of the steam pressure does not affect it, and it stops the usual water hammer in pipes. The pump and receiver, moreover, serve a good purpose in regulating brine circulating in refrigerating machinery and other similar uses. The water cannot accumulate in any quantity, as it lifts a float which opens the steam-valve to the pump, thereby starting the pump, which forces it to the point desired. The details of the arrangement are clearly shown in the illustration.

patents in the United States of the Priestman petroleum engine, which at present is performing very satisfactorily in England. Through the courtesy of Mr. Robert O. Ritchie, who represents the English syndicate now controlling the American patents, we were favored last week with an exhibition of two of the engines in actual working condition at 106 Washington street, New York.

One of the engines shown is rated at four and the other at one horse-power, and both strikingly illustrate the advantages of motors of their class, such as simplicity, ease of management and ready adaptation to any locality, great economy of oil,

lution, the charge being lighted by a spark from an induction coil worked by a single large cell. A supply of oil sufficient for a day's work is held in a tank in the engine base, and from there is conducted through a spray-pipe to a vaporizer, which, when starting, is heated by a small lamp, but afterward by the exhaust. A suitable supply of air also is admitted to the vaporizer, the proportion of air to petroleum being adjustable, so as to insure a proper explosive mixture. The charge is taken into the cylinder at the outstroke of the piston and compressed at the next instroke. At the following outstroke it is fired, and the exhaust takes place during

the fourth stroke. The action in this respect is similar to that of the Otto gas engine. A valve in the inlet-pipe prevents the propagation of the explosion back into the vaporizer. There is no slide-valve, properly speaking, but simply an exhaust-valve, which is worked by an eccentric. To the eccentric rod is attached, by means of an insulating handle, a metal knob, which describes a path somewhat resembling an ellipse, and is so placed that once in every revolution of the eccentric—that is to say, once in every second revolution of the crank, it bridges two metal springs which are insulated from each other and from the framework of the engine, and which form the terminals of the primary circuit of the induction coil. By this means once every second revolution the induction coil is set going and the charge fired at the right moment. It is claimed that no lubrication is required for the cylinder, the petroleum vapor serving to keep the surfaces in good condition.

Any of the refined varieties of petroleum can be successfully used, and crude oil has also been used with the best results. As to the actual oil consumption, we have before us a report of a test made a few months ago by Sir William Thomson. The figures, which he obtained with an engine loaded by means of a brake, with slightly more than six horse-power, showed a consumption of 1.71 pints per hour per brake horse-power. The whole of the oil is consumed and not only the lighter portions, so that there is no useless residuum. In view of the fact that the engine is said to show great regularity of running, it would appear to be well adapted to electric lighting purposes aside from its general utility in other directions, and in fact we are told that this is one of the uses to which it has been put with eminent success. With an early sale of the patents, it is not unlikely that the manufacture of the engine will soon be carried on here, a result to which small power users will, no doubt, look forward with interest.

The Loomis Fuel Gas Plant at Tacony.

The Loomis Gas Machinery Company have nearly completed the plant built by them under the patents of Burdett Loomis, of Hartford, Conn., at Tacony, Pa., in connection with the saw and file works of Henry Disston & Sons, at that place, a suburb of Philadelphia. While this particular plant is housed in a corrugated iron building, 40 feet by 98 feet, a works of the same capacity would only require a structure of 22 feet by 60 feet. Among the numerous systems designed to meet the growing demand for gaseous fuel for domestic and factory use that of Mr. Loomis, has occupied a prominent place. For three years a Loomis plant for manufacturing illuminating gas has been in operation at Cottage City, Mass., while the first fuel gas plant has been running regularly for over a year at the works of the John Russell Cutlery Company, at Turner's Falls. The works at Tacony have been in partial operation for some time past, while a large fuel plant is being built in connection with the Addyston Pipe and Foundry Company, at Addyston, Ohio, near Cincinnati. A contract has been closed lately for a large plant for manufacturing gas for factory and city use for Akron, Ohio, an illuminating works for Kenosha, Wis., and a fuel plant for the Waltham Watch Company, at Waltham, Mass., to furnish gas for all their boilers, or for forging, crucibles, annealing furnaces, soldering, tempering, &c.

The leading point in which the Loomis system differs from other methods of manufacturing water gas is that the generator is

run by down draft during the period when the coal is being brought to incandescence to decompose the steam passed through it in an opposite direction to manufacture water gas. The process therefore consists of two distinct periods, producing two products—one, generator gas made during the period of "blasting" when air is drawn through a column of fuel downward by an exhauster; second, water gas, produced by allowing steam to enter from below into the column of incandescent fuel, being carried off by a series of tuyeres in the generator above the fuel line. The advantages claimed for the down-draft system are that when the coal is being made hot during the blasting period, preliminary to the manufacture of water gas proper, the volatile gases passing down through the hot coal are fixed. In other words, the troublesome tars, &c., are decomposed. The down-draft system, it is claimed, tends also to reduce clinkering, there is no poking from the top, and the coal is charged during the blasting wherever spots of fire begin to show.

The Tacony plant consists of four generators, having a 9-foot outside diameter, 6-foot diameter fire-box, and 14-foot height, with a fire-brick grate and an air-tight charging hopper. Connected with the ash-pit is a vertical cooler, 2 feet in diameter and 18 feet high, the generator gas being drawn through its 30 tubes by a No. 3 Root's exhauster, the office of the cooler being to reduce the temperature of the generator gas made during the blasting period to 500 to 600 degrees. In this manner the injurious effects upon the exhauster of sudden and great fluctuations in temperature are avoided. The water in the cooler is used to feed the boilers, so that the heat is not wasted. The rest of the plant consists of a Heine boiler, set to be run with generator gas, which furnishes steam for two 9 x 12 engines, made by the Phoenix Iron Works, to drive the four exhausters, one engine being used for the day turn, and the other for the night shift. There was being built, too, at the time of our visit a set of retorts of special design for manufacturing illuminating gas with the water gas as a basis, the foundations for the purifier being completed while the last touches were being put to two holders, one of 20,000 cubic feet capacity for water gas, and one of 30,000 cubic feet capacity to be used for illuminating gas. Now it is being employed to measure the quantity of generator gas consumed and made. We may mention that the company have laid over a mile of pipe in the village of Tacony, and that a number of houses have their connections completed for fuel gas. The company have fitted up a room with stoves, lamps, &c., to show the domestic applications of the gas.

Turning now to the results obtained, it is stated that the relative proportions of generator and water gas show a production of 130,000 to 140,000 cubic feet of the former and from 40,000 to 50,000 cubic feet of the latter, according to the character of the coal used. Any kind of bituminous or semi-bituminous slack coal may be employed. So far as the employment of anthracite culm is concerned, we are advised that since the Tacony plant was built specially for bituminous coal it has not been determined how far it is possible to go with it as a part of the mixture. Thus far the maximum has been two-thirds of anthracite culm and one-third of bituminous coal. The 6-foot generators at Tacony each have a capacity for gasifying 8 tons of coal per 24 hours, and it is estimated that the size now contemplated for subsequent plants, 7 foot diameter of fire-box, will convert 10 tons daily into gas. When running on generator gas alone as large an amount of steam is introduced into the generator as is consistent with a continuous run, so that the product is a

gas which practically is intermediate between the ordinary Siemens producer gas and pure water gas. The Tacony plant, which was built under the supervision of Mr. S. T. Williams, general manager of the steel works of Messrs. Disston & Sons, has been used for some time past to test the value of fuel gas in its application to the different departments of these works.

At the time of our visit the striking differences in the convenience of using solid and gaseous fuel were well illustrated in the forge and hardening shops of the works. In the file forging shop a number of the gas and coal forges were at work, though the latter are being taken out as rapidly as possible. The contrast in cleanliness, ease of supervision, comfort to the men and uniformity of heating was remarkable, and even though the comparative cost has not yet been ascertained, these incidental important advantages would insure the employment of gas even if there were a balance against it. In the saw hardening department one furnace has been remodeled to use gas, and others are following. There, too, the same features are striking, being coupled besides with a decided gain in the amount of work one man can do and with the advantage that the entire handling of coal and of ashes is dispensed with, and that it becomes possible to economize considerably in floor space. For some time past Loomis generator gas has been used in a Siemens reheating furnace with a 7 x 12 foot hearth, used in connection with an 18-inch bar mill. According to the superintendent, its superiority over ordinary Siemens producer gas has been well shown in the smaller consumption of gas and in the more rapid and better working of the furnace. Permanent connections are now being made with the main mill, and within a week fuel gas will be used exclusively. Gas flues are being laid to connect with all boilers in the steel works, and in a few weeks they, too, will be fired with generator gas. Thus far the latter only has been employed. Later on a practical demonstration is to be made with the use of pure water gas in a Siemens furnace. It is claimed that the saving of labor in running these Loomis generators on generator gas over the Siemens producers is very large, one man doing the work of three; and the gas is made under pressure and can be carried to any number of furnaces, direct, without use of stack draft and the flow regulated perfectly.

Southern Pig Iron Freights.—The Southern Railway and Steamship Association, under date of the 18th inst., have issued a new schedule of freight rates, to take effect on October 1st, the following being the principal rates, all per ton of 2268 pounds:

	Birmingham.	Chattanooga.	Sheffield and Florence.
Chicago, Detroit, Hegewisch, Grand Crossing, Peoria, Pullman, South Bend.....	\$4.15	\$3.90	\$3.90
Allegheny, Bellaire, Pittsburgh, Steubenville, Wheeling.....	4.80	4.30	4.55
Cincinnati.....	2.90	2.40	2.65
Columbus, Dayton.....	3.65	3.15	3.40
East St. Louis, Belleville, St. Louis.....	3.40	3.15	2.95
Indianapolis, Terre Haute.....	3.40	3.15	3.15
Kansas City, Leavenworth, St. Joseph, Atchison.....	5.98	5.98	5.53
Louisville, East Cairo.....	2.65	2.40	2.40
Springfield, Ill., Bloomington.....	4.40	4.15	4.15

The Queen and Crescent route have issued a circular announcing an advance of 15 cents a ton over their tariff No. 7, dated August 1, 1888, to go into effect October 1.

New Steam Drop Press.

We illustrate on this page a drop press recently built by the E. W. Bliss Company, of Brooklyn, N. Y., for heavy stamping purposes. The requirements of the case for which it was designed called for a hammer, which, together with the soft metal force to be attached, should weigh 6000 pounds, and that a clear space of 48 inches between guides should be had. The excessive weight to be lifted rendered the

forged iron hammer head. The piston has two grooves turned into it, in which are inserted four tool steel packing rings, as rings made of any other material would not stand the jar to which they are subjected. The piston, piston-rod and hammer weigh together 3000 pounds, and in operation an additional weight of 3000 pounds of soft metal may be attached. The port at the upper end of the cylinder enters 4 inches below the head, leaving this amount of space for cushioning on the up stroke.

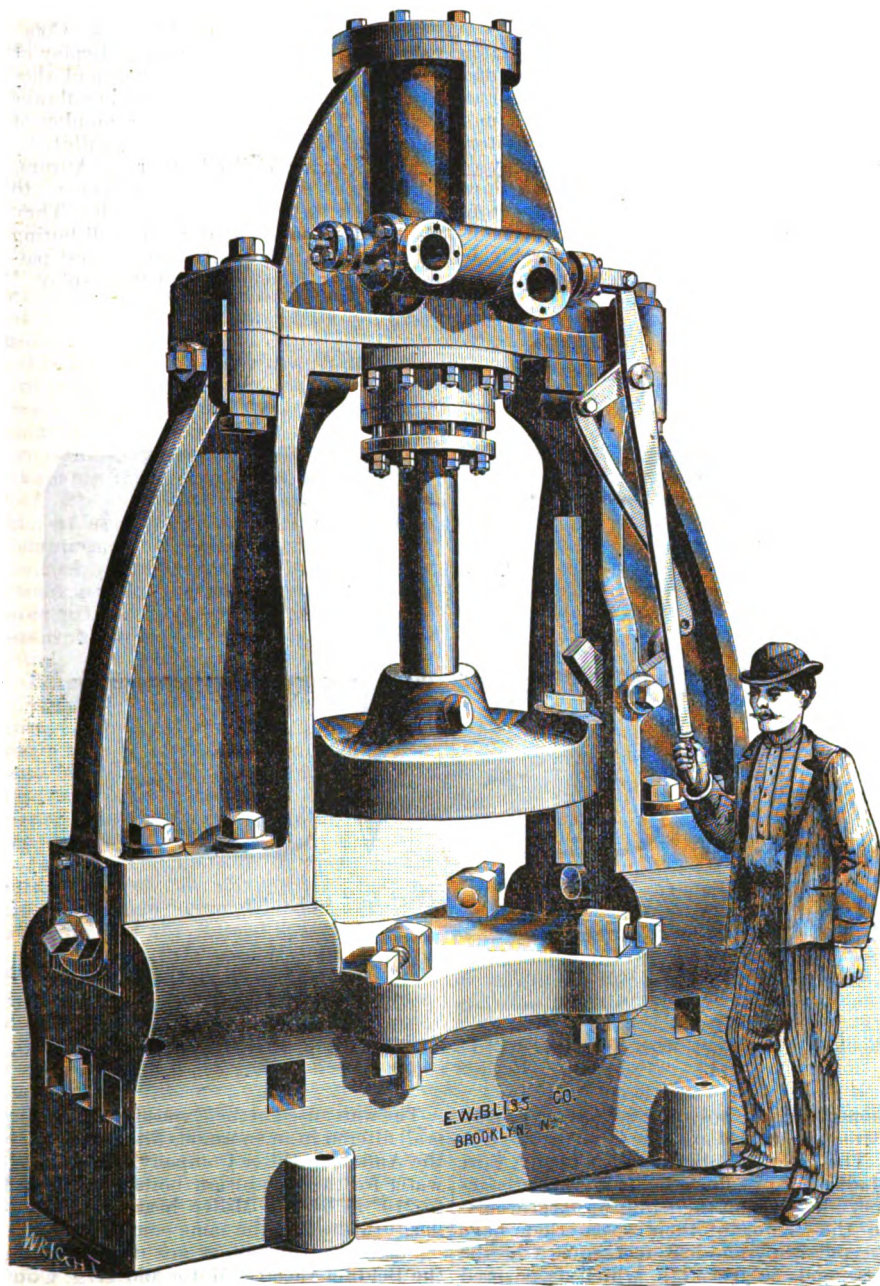
per cent. of the initial steam pressure. By this back pressure not only is the piston greatly retarded in its upward stroke, but, when cushioning occurs, it commences upon nearly full steam pressure, instead of upon atmospheric, and a leak would need be very serious and the upward tendency of the piston very persistent to neutralize this powerful persuader against further motion. When the valve is reversed, so as to exhaust the steam below and allow the hammer to fall freely, the upper port is open its full area and escaping steam enters from below the upper end of the cylinder.

The housings, which carry the cylinder and furnish a guide for the hammer, are secured to the bed by four bolts passing down through the bed to pockets, in which are the nuts, kept from jarring loose by rubber washers. The screws, by means of which they are adjusted laterally, to compensate for wear on the hammer, pass through wrought-iron poppets, let into the bed in the same manner as the four poppet screws shown in the cut for holding the die. The cylinder is secured to the housings in a similar manner. In order to prevent the hammer from descending when steam is turned off a latch is provided in the right-hand housing, as shown, which is so connected with the hand lever, which operates the valve, as to be moved out of the way when the hammer is allowed to fall. When steam is on no such support is necessary. The other general details are: Extreme width of bed, 7½ feet; weight of bed, 25,000 pounds; width between housings, 48 inches; extreme height, 12 feet. Total weight, 45,000 pounds.

The Forty-Mile Limit for Pittsburgh Coal.—Several months ago the different railroads leading from Pittsburgh agreed to a rate of 90 cents per ton on all coal shipped within a radius of 40 miles of Pittsburgh to the lake ports. For some time past the Pittsburgh operators have claimed that firms outside the 40-mile limit are securing the benefits of the 90-cent rate, and these, it is said, can have coal mined at from 25 to 30 cents per ton cheaper than operators nearer Pittsburgh. At the last meeting of the Pittsburgh Railroad Coal Association a committee was appointed to protest against the abuse. The new scale of 79 cents per ton to be paid the miners goes into effect November 1, as per agreement of the Interstate convention of miners and operators held in this city the first of the year. It will be an advance of 5 cents per ton over the present rate.

A press dispatch dated St. Louis, September 18, reads as follows: On October 1 a general strike of the coal miners in the St. Louis district will be inaugurated, and unless the operators back down from the position taken to-day, 40 mines will be shut down. All the mines are located in Illinois, and Belleville is the center of the district. The mines are nearly all controlled by a trust called the Consolidated Coal Company. At a convention of the miners held Saturday, in East St. Louis, a demand for an advance of ¼ cent per bushel was made. This meant an increase of 50 cents a day. To-day a committee waited on the trust, presented the demand, and met with a flat refusal. Then the committee gave notice of the strike.

Ground was broken in Pullman, Ill., on the 18th inst., for the construction of the Pullman electric railway. A complete circuit of the town will be made. The Van de Poel system will be used. The cars will be of the finest pattern made by the Pullman Palace Car Company. They will be about 30 feet long, and will contain smoking rooms, toilet apartments and other conveniences.



NEW STEAM DROP PRESS, BUILT BY THE E. W. BLISS COMPANY, BROOKLYN, N. Y.

use of any of the mechanical appliances ordinarily used for the purpose of catching the rebound and lifting the hammer too uncertain and too easily subject to derangement from constant shock to be considered available and recourse was had to direct steam pressure.

The cylinder at the top is 16 inches bore by 24 inches effective stroke and is single acting. Steam is admitted at the lower end for lifting the hammer, but there is no pressure on top of the piston, except back pressure from the exhaust for the purpose of cushioning, as will be explained. The piston and piston-rod are forged from a single steel billet and the lower end of the rod, which is 7 inches in diameter, is turned slightly tapered and keyed into the

As the machine is operated with 100 pounds of steam, it was thought necessary to provide additional security against striking the head, especially as when the rings became a little leaky (and in this class of machinery it is impossible to keep it absolutely tight) the cushion pressure would be lost to some extent. To accomplish this the valve, which is of the piston type, and also fitted with tool steel packing rings, is so arranged that when steam is admitted to lift the piston the upper end of the cylinder is open to the exhaust through a port opening of only one one-thousandth of the area of the piston. This creates a back pressure on the up stroke which, when the piston reaches the point of passing the port, amounts to about 80

The Snow Belt Fastener.

We show on this page several modifications of a belt fastener, known as the Snow fastener, and put on the market by the Common Sense Belt Fastener Company, 176 Superior street, Cleveland, Ohio. The principle of the device is at once apparent from the engravings and requires little explanation.

Fig. 1 shows the simplest form, the pegs being driven through the ends of the belt, these being put on a block and clinched. By using a wooden block all danger of breaking the fiber of the belt is avoided. Fig. 2 represents a detachable tooth fastener made of Bessemer steel. The plate is case hardened so as not to bend or bruise in removing the teeth, the latter being annealed to bend and not break. The teeth are adjusted to the plate and riveted with a rivet punch or hammer, requiring only a slight head so as to be easily driven out with a steel punch. For light single belts single teeth fasteners are recommended, while for heavy or

payment of damages. The *Ætna* Iron and Steel Works, however, have a charter of incorporation under that name, while Clark, Raffer & Co. were not incorporated under the name *Ætna* Iron Works, but merely adopted that to designate their establishment. The conflicting claims arising under this peculiar complication of affairs will give the courts a little trouble to solve, with exact justice to the interests involved.

Chicago Interstate Industrial Exposition.

The entries at the Chicago Exposition this year are not so rich in machinery and mechanical appliances as those of previous years. A few machines are shown in motion, but the great bulk of the exhibitors evidently preferred to make a display of actual products rather than illustrate how they were made. It is a rich collection, however, in almost every line of mechanical industry, comparing very favorably in that respect with its predecessors, and de-

effective manner in which they have been displayed to attract attention.

Brown Bros. Mfg. Company, of Waterbury, Conn., have a unique exhibit of vault and sidewalk lights. In the center of their section they have placed a framework of iron, 12 feet square and 2 feet high, studded with sidewalk lights. On this as a pedestal they have placed a pyramid of iron framework, about 4 feet high, with its faces also composed of sidewalk lights. Samples of vault covers, coal-hole covers and similar work are grouped about the central attraction.

Schenck's Adjustable Fireback Company, Chicago, Ill., have a large display of Westphal's revolving screw, bolt and shot cases, and revolving self-draining flower stands. These are shown in a number of sizes, and form a very striking exhibit.

The American Well Works, Aurora, Ill., have a well rig in place to show their method of sinking wells. They also exhibit samples of their well-boring appliances. A windmill of their latest pattern is a conspicuous part of the display.

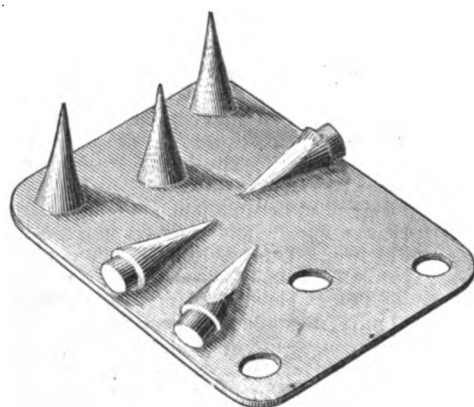


Fig. 2.—Detachable Tooth Fastener.



Fig. 1.—Common Sense Fastener.

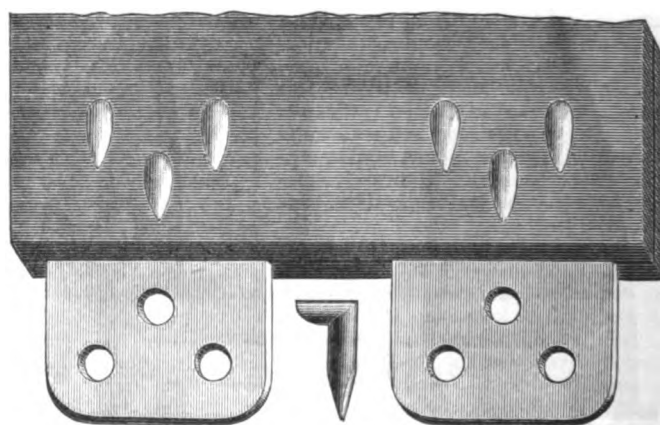


Fig. 3.—Steel Belt Coupling.

THE SNOW BELT FASTENERS, MADE BY THE COMMON SENSE BELT FASTENER CO., CLEVELAND, OHIO.

double leather belts two rows of teeth or double fasteners are desirable.

In Fig. 3 we show a coupling of special type applied to one end of a double thickness belt. The method of application is similar to that used in connection with the fastening illustrated in Fig. 2, hook rivets, however, being employed. In using this coupling the pegs of the belt are opened with a suitable tool, and the fastener plate is inserted to the proper depth. Points are then marked and holes punctured with a pegging awl. The hook rivets are then driven and clinched as already described.

Clark, Raffer & Co., of Chicago, who have for many years conducted an architectural iron business under the name of the *Ætna* Iron Works, have filed a bill against J. Louis Pfau of the same city, manager and secretary of the *Ætna* Iron and Steel Works, organized in 1886 to engage in a similar class of work. The complainants claim that the latter company, through the name they have adopted, have been receiving orders intended for the former, and that their business is thus being seriously interfered with. The court is asked to restrain the defendants from using a name so similar to that under which the complainants have long been known, and to compel an accounting and

monstrating the possibility of keeping up an attractive array of exhibits from year to year.

The Iowa Farming Tool Company, Fort Madison, Iowa, have made a very satisfactory showing of their line of farm tools. In the center of their space they have erected a pyramid 8 feet square at the base and 30 feet high, which is covered with red cloth and hung from top to bottom with fancifully arranged samples of their hoes, forks, grain cradles, ox-bows, &c. A very handsome specimen of their tool rack, for use in displaying samples in stores, occupies a conspicuous position as part of the exhibit.

The Wheeler Reflector Company, Boston, Mass., have a neatly arranged pavilion hung with various kinds of lamps to show the different styles of reflectors manufactured by them. From the ceiling are suspended large reflectors with glass pendants, while the walls are filled with a great variety of lamps and reflectors intended for almost every use.

The Meriden Britannia Company, Meriden, Conn., have a very handsome pavilion, with a blue arched roof, black and gold posts, large plate glass windows, covering every side, and polished Tennessee marble panels in the base. The specimens of their work shown embrace the most artistic specimens of table-ware, worthy of the very

The water used in the Exposition Building is all filtered in an enormous filter erected by the American Filter Company. The feed-water for the exposition boilers is heated to 210° F by the Miller heater and purifier furnished by the same company.

Small electric motors are displayed by the Belding Electric Motor and Mfg. Company, of Chicago, and the C. & C. Electric Motor Company, of New York. The Belding Company have a number of their motors operating fans, sewing machines, &c., as a special exhibit. The motors shown range from $\frac{1}{4}$ to 1 horse-power. The C. & C. Company have their motors distributed among the operators on sewing machines engaged in turning out fancy work in several pavilions.

The Chapman Valve Mfg. Company, Indian Orchard, Mass., make a decidedly attractive display of their valves. They have them handsomely painted, and the central feature of the section is a stand having four semi-circular shelves, tapering in size from the bottom to the top, each filled with valves of corresponding size. Groups of valves of various patterns are placed around the base of the stand.

The Machinists' Supply Company, Chicago, have an entire section filled with lathes, drills, portable forges, and show cases with small tools under cover.

Borden, Selleck & Co., of Chicago, exhibit one of Harrison's conveyers for automatically handling coal, ore, grain, &c.

F. Hainsworth & Son, proprietors of the Unique Wrought-Iron Works, show a large number of samples of ornamental railing of peculiar pattern manufactured under their patents. A great deal of the iron is crimped throughout, even the small circles, scrolls and bends being formed of crimped strip iron. Their work also comprises frames for grates, grate guards and irons, ornamental arbors and other articles in highly ornamental designs.

The F. P. Smith Wire and Iron Works exhibit a great variety of wire goods, illustrating the almost endless uses to which wire can be adapted in the hands of the ingenious workman.

The Expanded Metal Company, of Chicago, make a good display of their special product. They have inclosed their space with a fence and gates made of expanded metal and have hung in a conspicuous position a card bearing in large letters the notice: "This is not wire." In addition to fencing they exhibit arbors, tree boxes, mats, lawn furniture, &c., made of their metal.

The exhibit of the Marinette Iron Works Company, Marinette, Wis., is quite extensive, as their line embraces such a variety of articles. Among other things shown by them are the Hutson Giant Fire King, which is a one-man chemical engine, mounted on two wheels, with hose reel, &c., complete; the Michigan Lubricator Company's improved sight feed lubricator; the Montgomery automatic and compound grease cup; Brock's patent chain-pipe wrench; the Penberthy improved automatic injector; brass and iron valves, pipe fittings, &c.

The Nye Steam Vacuum Pump Company, of Chicago, exhibit a large number of their pumps, intended for mining, irrigation and wrecking purposes, and for pumping sand and gravel. Some of them are shown in active operation, discharging immense quantities of water and demonstrating their undoubted efficiency.

The steam engines used in operating the machinery of the Exposition, running electric lights dynamos, &c., are the Buckeye and the Russell engines.

The Union Indurated Fibre Company, New York, make a very fine exhibit of the ware manufactured by them from wood fibre. Pails, liquid and dry measures, wash-basins, water-coolers, tubs, keelers, milk pans, &c., are shown in great variety, and they are arranged in a way to attract the notice and excite the interest of those who come within range of it. The remarks made by visitors concerning it show that this ware is still a matter of great curiosity to a considerable portion of the population of the country.

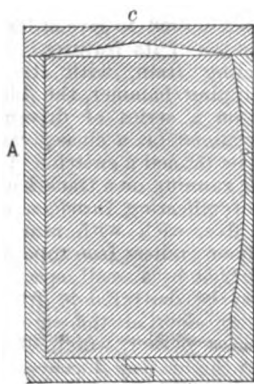
Exhibitors of other goods of interest to our readers are as follows: David Bradley Mfg. Company, agricultural implements; Clive Mfg. Company, hardware specialties; Cornell Engine Company, gas engines; Clinton Wire Cloth Company, Clinton, Mass., wire cloth; Chemical Fire Extinguisher Company; Corrugated Elbow Company, Cincinnati, Ohio, stove pipe; Copeland Engine Company, Camden, N. J.; Harden Hand Grenade and Fire Extinguisher Company, New York; Charles Kaestner & Co., Chicago, brick machinery; C. Sidney Shepard & Company, Buffalo, N. Y., tinware; Jenney & Graham Gun Company, guns. Stoves are also well represented by a number of the leading manufacturers.

The fifty-second meeting of the American Institute of Mining Engineers will be held at Buffalo, N. Y., beginning on Tuesday evening, October 2, 1888. Dr. Julius Pohlman, director of the Museum of the Society of Natural Sciences, is

secretary of the Local Committee, and correspondence concerning the local arrangements, hotel accommodations, &c., should be addressed to him.

The Disston Steel Works.

Operations are being actively pushed to rebuild that portion of the steel works—a part of the file and saw manufacturing plant—of Disston & Co. which was destroyed by fire some time since. The crucible steel department and the sheet rolling mill was the property partly destroyed by the fire. The disaster has been seized as the opportunity for extensions and improvements. The height of the building has been increased by 8 feet, and the Scheffler Bridge Works are completing a handsome iron roof of two spans, one 105 feet and the other 93 feet 10 inches, the former being over the rolling department. The new building is 198 feet 10 inches wide by 305 feet long. The crucible steel works have three 24-pot furnaces, while the sheet-rolling department contains four trains. The 28-inch plate train is driven by a 28 x 80 inch I. P. Morris engine, while a 22 x 48 inch engine from the same maker drives one of the two 16-inch trains of the mill. The second 16-inch and a 20-inch train are driven by a vertical 28 x



Mold for Solid Steel Ingots.

44 inch engine. A good deal of this machinery suffered heavily from the fire, and important parts of it had to be rebuilt. The mill is equipped with the necessary complement of shears and punches, and the heating furnaces, whose waste heat is utilized by Haselton boilers. In addition to them a 600 horse-power Heine boiler is being put in.

The bar mill is a later enterprise of the Disstons. It contains an 18-inch mill, three-high, with five stands of rolls, and a 9-inch train, just completed; also with five stands of rolls. Each of these is driven direct by a separate Porter-Allen engine. Steam is furnished by two batteries of 300 horse-power Heine boilers. This mill, being covered with an iron roof, was not injured by the fire. At the time of our visit one train of rolls in the sheet mill and two melting furnaces were running under temporary roofs, and in a few weeks the largely remodeled mill will be in operation.

A new water works is also being erected at Tacony, the plant consisting of a compound condensing Worthington pump of 2,000,000 gallons capacity, to supply both the factory and the village with water.

From a technical point of view, one of the most interesting features in connection with the Disston Steel Works is

THE WILLIAMS PROCESS OF MAKING SOLID INGOTS,

which has been in use for a considerable period. The process was patented by Mr. S. T. Williams, on December 8, 1885, and at the time of the fire 19 presses were in operation, while 12 more were being built, the percentage of split saws having been reduced to a minimum as the result of

their use. Piped saw plate ingots rolled into saw plate and manufactured into saws do not show their defects until the last stages of manufacturing large circular saws are reached, the unsound ingot showing its defect in the splitting of the saw plate. The loss, of course, is heavy, since the final stage of manufacture is reached before the defect is detected, and the article must wander into the scrap heap. Mr. Williams casts the steel into a mold hollowed out in the manner shown in the accompanying illustration.

Into a mold of the above character the melted metal is poured, and as quickly as possible thereafter a hot cover or plug, *c*, is placed on the top of it. The cover may be made of any suitable material; but a refractory material is the best. The cover is either put on in such a position as to leave a small space between it and the metal in the central portion of the top of the casting, or the bottom of the cover may be hollowed or dished out to form a cavity, as may be deemed best in practice. As soon as the metal in the mold has set sufficiently to hold the molecules together, the mold is opened on the side or sides next to the belly or bellies (for the mold may be hollowed out on both sides instead of one only), and a pressure-plate is inserted with its flat side against the belly and its convex side opposite the hollowed-out portion of the mold, and the hollowed-out portion of the mold put in plane and pressure applied. The metal composing the belly portion of the ingot is thus forced inwardly, and the more movable portion of the ingot located at its central part is thereby forced upwardly or outwardly into the space or chamber beneath the hot cover, filling the same, and thus forming a head of metal kept in a soft or liquid form by the heated cover, and ready to feed into any pipe or cavity which may form in the ingot as it cools. After sufficient pressure has been applied to fill the head cavity the pressure is more gently continued for some minutes, to hold the metal well together, in order to prevent the pipe or cavity which is being fed from the head from becoming any larger than can be avoided.

The pressure-plate, it will be observed, is constructed with one side convex and the other plane. The convex side is preferably of such shape and size as to just fill the hollowed-out portion of the mold, and the ingot, when cooled, will thus have a plane face on the side where it originally bulged out; or, if it is not necessary that the ingot should have a plane surface, an ordinary plane-faced mold can be advantageously employed and the pressure-plate inserted with its convex side toward the ingot. The head for supplying the pipe is kept hot by the hot cover and remains in a liquid state sufficiently long to feed the pipe until the metal ingot has become cooled and set to the very top. It is the better plan to put a slight pressure on the top of the plug to hold it in place; but this is not necessary if the pressure on the pressure-plate be applied very evenly and gently.

The pressure is applied with the aid of a hydraulic press of special design. We are informed that the result of the introduction of the method has been not only to avoid the dangers growing out of piped ingots, already alluded to, but that the quantity of steel cut from the heads of ingots has been reduced to 5 per cent., or practically to what is needed to trim them before rolling.

The Ontario Mining Commission, during a recent tour on the north shore of Georgian Bay, discovered mines represented to be very rich in copper and nickel; and, 80 miles west of Port Arthur, is an iron district which promises to be among the richest in America.

Those Exported Boiler Tubes.

Some time since considerable capital was made out of the fact that a Boston boiler tube maker had exported a small lot of boiler tubes for one of the foreign manufacturing of the Babcock & Wilcox Company. Writing from Haarlem, Holland, Mr. George H. Babcock, of the firm, gives the facts and comments on them in a letter, from which we quote the following:

I was surprised to see that that transaction was instanced as an evidence that the American system of protection to home industry was a failure and that the boiler tube manufacturers would be better off under free trade. Now, while boiler tubes are our "raw material," and, in common with other manufacturers, it would be for our interest to have our raw material duty free, provided the duty was retained upon boilers, our manufactured product, yet I fail to see how the fact quoted is evidence of the approach of that desired condition. It is true that we did order a bill of steel boiler tubes to be shipped from Boston and delivered at a slightly less price than we could buy the same quality of tubes in Glasgow. But this is not so strange when we consider that the price in Glasgow is abnormally high, owing to a combination among manufacturers, and represents a very large profit on the cost of production.

The Boston house, getting its stock at foreign prices, plus 10 per cent. duty, found it could in this case afford to realize enough less profit than the foreign manufacturers were demanding to balance the extra cost of labor, duty on material and freight. Were the makers of Scotch tubes so disposed they could undersell the price paid the Boston house by probably 40 per cent. and still make as much profit as the Boston makers did on this transaction. In proof of this we are buying in Glasgow certain tubes which do not come into the combination rates at prices which would soon bankrupt any American manufacturer.

I note your remark that "without the 45 per cent. that must be paid on the same steel when used for goods sold in this country they could be sold so much cheaper here, the quantity made would increase, more labor would be employed, and every one would be benefited—in short, the exactly opposite effect would be secured from that produced by a 'protective tariff.'" That is, assuming the duty to be taken off the "steel skelps," the tubemakers' "raw material," and retained on the tubes, his "finished product." The same might be true, possibly, of every manufacturer, provided it did not at the same time act reversely and to a counterbalancing extent on some other product. In the case supposed, would not the labor thrown out of use in providing the "skelps" more than equal any additional labor employed in making more tubes? But the steel rolling mills thus stopped would decrease the demand for boilers and boiler tubes, and so would there not be fewer made rather than more? and so labor would suffer while no one is benefited.

My experience of 20 years shows that that amount of reduction would not cause any perceptible increase in the demand either for tubes or boilers. The Babcock & Wilcox Company are probably the largest user of boiler tubes in the world. Their sales in June last alone in Europe and America required the use of 1,000,000 feet of 4-inch tubes. These we buy in the United States, Scotland, Germany and France, as we have occasion, and, of course, buy as cheaply as anybody. Now, though the American maker pays twice as much for his labor and much more for his material, he sells within 10 to 20 per cent. of the price in free trade countries, notwithstanding the fact that he is "protected"

by a tariff amounting to about 100 per cent. on the cost of production. This means that he makes less profits than the man who manufactures under free trade, while the entire benefit of "protection" is reaped by the laborer. It means another thing also—that there is no truth in the often-repeated statement that a tariff increases the cost to the consumer equal to the amount of the duty. Tubes have been sold in New York within the last five years at a price less than the amount of the duty on the same tubes if imported, and they can be bought to-day at a small advance upon that figure. The effect "produced by a protective tariff" is "the exact opposite" of that commonly attributed to it by the advocates of free trade or a "tariff for revenue only." It seems, in practice, to reduce the cost to the consumer of most articles of necessity, and many of luxury, while it enhances the rewards of labor and reduces the profits of manufacture.

The New Edgar Thomson Rail Train.

Since the completion of the new rail train, the Edgar Thomson Steel Works, Braddock, has become the Mecca of rolling-mill men. Lately a representative of *The Iron Age* paid a hasty visit to that plant, which served to give at least a general impression of its features. From the old blooming train, with its adjacent bloom chipping hammer, the blooms are delivered on a series of driven rollers, which, arranged on a curve, carry it to what may be termed a switch. They then reach a car running on a track back of the long line of reheating furnaces, of which there are five, each with nine working doors. By an endless iron rope wound on a drum driven by a small special engine the car may be delivered in front of any one charging door of the series. Every furnace has a pusher, which delivers the bloom into the heating furnace. In front of the heating furnace is a similar arrangement for drawing the heated blooms. A special engine runs an endless wire rope, to which is attached a car. Upon the latter the drawing apparatus, with an ingenious grip, deposits the bloom. The latter is conveyed to the driven rolls, which run the bloom upon the table of the first train.

Practically Capt. W. R. Jones has divided the ordinary three-high rail train into three, the first five passes being made in one train, the second five in a second train to which the first delivers directly, and the last finishing pass being made in a third train. A crane commands the latter, so that the finishing rolls can be rapidly changed. Each train is driven by its own independent engine, and is practically automatic, one man handling the levers which lift the tables, turn the bloomer, &c. From the table of the first train the billet goes to the second; from there by driven rollers to the finishing train. From the latter the rail is carried along by driven rollers to the hot saws, the metal traveling in all these operations along the axis of one long building. The hot beds are located in a wing at right angles to it, and then are taken back in the direction of their length into the drilling and pressing building, which is parallel to the rolling mill building, they traveling then in a direction opposite to that in the latter. The finished rails are pushed sideways out of this building to the cars on which they are shipped. The boiler house has two batteries of 12 boilers each, and we noticed particularly that along one entire side of the rolling mill proper is a bench upon which lie the rolls. The whole arrangement is a radical departure from all former types, and it needs only a glance at the never ceasing procession of blooms entering at one end and of finished rails passing the saws to appreciate the

enormous capacity of the plant. It is rated at 1000 tons of finished rails a day. Its record even now is 962 tons, and there is probably no exaggeration in the remark made by the engineer of one of the leading Eastern mills whom we happened to meet just after he had, for the first time, seen the plant, that it would not be a matter of surprise to him if the new mill would arrive at a record of 1500 tons a day. The mill is certainly an enormous stride in advance, and being practically automatic would seem to represent the possible climax of labor-saving in that direction. The impression is created by an inspection of it that this new rail mill overbalances in capacity the other parts of the plant, that one or more new blast furnaces, an enlargement of the Bessemer steel department, and notably an addition to the blooming capacity would become necessary in the not distant future. We repeat that this is merely an impression, and that the idea is thrown out without any accurate knowledge of the relative capacity of the different parts of the plant.

Few charges have been made in the other departments. At the blast furnaces one metal mixer is in use and a second one is being built. On both sides of the Bessemer steel works a hydraulic pusher has been put up, to push the ingots out of the molds, no effort being now made to strip in the pit.

Industrial Jubilee at Louisville.

On the 5th inst. the people of Louisville held a grand demonstration to commemorate the industrial and commercial progress made by the city within the past decade. The business of the city and its enterprising suburbs has grown so rapidly of late years that the citizens may well take pride in the success of their endeavors to put the metropolis of Kentucky high on the roll of the progressive cities of the country. To emphasize the forward movement they have made, and to let the outside world understand something of its importance, this industrial jubilee was planned by the citizens who have taken the most active interest in stimulating the city's growth in manufacturing industries. The active agencies with which they are identified are the Commercial Club and the Board of Trade. These bodies have done so much toward building up the trade of Louisville that they can properly be mentioned as examples of energy and enterprise worthy of emulation by similar organizations in other cities. The growth of Louisville's business is shown by the last annual report of the Commercial Club, which enumerates 65 manufacturing establishments, 27 wholesale commercial houses, and 291 retail commercial establishments added to the business interests of the city in the previous 12 months. Quite a number of these are directly traceable to the influence of the two organizations mentioned. Since 1880 the annual volume of business is estimated to have increased \$150,000,000.

The industrial demonstration which took place on the 5th inst. is reported by observers to have been a magnificent spectacle, far superior to the usual advertising pageants which so often masquerade under that name. The various business interests of the city entered with spirit into the proper observance of the real purpose of the display, and originality was manifested with most striking effect where it was least expected. The Louisville dailies, particularly the *Courier-Journal*, contained glowing reports on the following day of the magnificent success which had been scored by those who originated and managed the great jubilee. Special editions were issued, calling the attention of visitors and of the outside world to the advantages of Louisville, and to the great natural wealth

of the State of Kentucky to which it virtually holds the key. The success of this celebration will stimulate the efforts of the business men of Louisville still further to push forward their plans for greater growth and wider influence, even though it may not directly attract capital and increase investments.

The manufacturers of Louisville anticipate a decided increase in the business of their city with the advent of cheap fuel, which is promised by the projectors of natural gas-pipe lines from wells in Meade County, 25 miles southwest of Louisville in an air line, but 30 miles distant by the route surveyed. The wells now flowing produce 16,000,000 feet of gas daily, and the supply can be largely increased whenever it is demanded. It is announced that one company has already arranged to lay pipes between its wells and the city, making its operations an assured fact. The supply of natural gas at low cost in unlimited quantity would be a great boon to Louisville, although it is located within easy reach of Kentucky coal fields, and also receives large supplies of coal from the upper courses of the Ohio River. With such a fuel Louisville would take greater strides than ever toward industrial greatness, and its jubilees of future years would totally eclipse the glory of the recent celebration.

Notes from Providence, R. I.

Charles Frederick Herreshoff, whose funeral took place in Bristol recently, was father of one of the best known families in Rhode Island. The late octogenarian was born in Providence and removed to Bristol from the old farm in 1856. A graduate of Brown University, he was, with the exception of Bishop Howe, the only survivor of the class of 1828. He was deeply interested in boats and boating—a characteristic that was inherited by two of his sons, John B. and Nathaniel G. of the Herreshoff Mfg. Company, which has given Bristol celebrity as the town which furnishes the best and fastest steamers in the world. When the Company was in its early days the deceased helped model some of the fastest boats built at the Herreshoff shipyard, and in connection with the death of this well-known citizen a short account of the industry bearing his name may be of interest.

The president of the company, John B. Herreshoff, is one of the remarkable men of the country. For years he has been blind, but the misfortune of loss of sight has not impaired his capacity for practical work, and as president and treasurer of the company he is as active and efficient as though he has the keenest eyes. An instance of this was recently mentioned in the *New York Sun*. About ten years ago he received a telegram from one of the South American consuls in New York, asking him to come to his office down town at a certain hour. He went and found several representatives of the South American Government. They wanted three torpedo boats of a novel design built, and they wanted them built in sections, so that they could be shipped to their destination and there put together. They wanted several odd conditions in the boats, and then they wanted to know for how much Herreshoff would build them.

"I must have time to think it over," he said.

"How long a time?"

"Oh, 20 minutes."

Twenty minutes for a blind man to consider the plans and specifications for these torpedo boats—to consider them without pencil or paper—to perform roll them over carefully and minutely in his head! But he did it. In 20 minutes he had made a mental estimate of what they would cost;

he got the contract, and they were at a specified time packed and ready for shipment. That was a remarkable incident, but John Herreshoff is a remarkable man, and he has built some remarkable boats.

The Herreshoff children took to boats, and it isn't strange, therefore, that John Herreshoff began whittling out boats as soon as he was old enough to manage a jack knife. In his fifteenth year he built a good sized craft for sailing on the bay. About this time he lost his sight; gradually a film came over his eyes, but he went on building boats just the same, but instead of studying the grace and strength of lines by his eye, the matter became to Herreshoff at once a more abstract study, a mental calculation. He had the task before him of carrying in his mind the models he worked upon. The objects he had seen with his eyes in the first 15 years of his life he could summon up into his mind again. Under the enforced habit of mental activity, without the interruption and suggestion of outside objects, his mind grew to be one of remarkable concentration and acuteness. He became able, for instance, to set up before himself, from a careful description, a piece of machinery, and to explain its workings and its faults. His sense of touch developed to a wonderful sensitiveness, too. He learned to recognize the power of lines by rubbing his fingers slowly over them, and how well he succeeded in finding the good and discarding the bad has been shown by many a craft built in the early days of his business, which made a record on the Narragansett like the old *Qui Vive*, for several years the fastest boat on the coast, and the *Sadie*, a 52-foot sloop, which was sold to Mr. Burgess.

But this was when Herreshoff was building only sailing vessels. It was not until after 1873, when Nathaniel Herreshoff became interested with his brother, that the Herreshoff steam vessels made their appearance. Mr. John Herreshoff had been thinking over the coil boiler idea for some time, and when it was applied to steam craft it was so successful that the building of sailing vessels was at once abandoned. The industry at once jumped into prominence, and the shops were used for making every part of the vessel. John B. Herreshoff became the president and treasurer of the company, Nathaniel Herreshoff the general superintendent and designer, Charles Young the secretary, and Albert Almy chief of construction.

There is no doubt that in the public mind there is a partial misapprehension of the part the third Herreshoff takes in the construction of boats in the shops of the company. The average individual who has heard of Herreshoff would very likely expect to find him industriously at work upon a model or laying down the lines in some ingenious way for a new boat. But there are a big boiler shop, engine shop, boat shop, repairing shop and docks, all with their quota of men, whom John B. Herreshoff, as the president and head of the company, controls.

Mr. Nathaniel G. Herreshoff, who is not blind, like John and others in his family, is the designer. He works out the models, makes the calculations, &c.

The Narragansett Electric Lighting Company have begun the construction of a new station at the foot of Elm street, on the river front, where a lot of land 200 x 300 feet, has been bought, with a wharf frontage of 200 feet. The contracts are not all concluded yet, but the foundations are in for the dynamo-room, 60 x 200 feet, a single-story structure, to be built of brick, with brown-stone trimmings and an iron roof. The pile foundations are also down for the (tack, which will be a 14-foot flue, octagon in section and 200 feet high. The boiler-room will be in a separate building, across a driveway, and coal

pockets will be built over the boiler-house, into which coal may be delivered from vessels with but a single handling. The premises are arranged so as to allow of duplication of both the power and dynamo houses if necessary, and the lot will afford opportunity for the establishment of one of the largest stations in the country.

The Armington & Sims Engine Company, of this city, are making a number of engines for the Navy Department, the engines to be coupled direct to the dynamo. But a small space is required for their double engine, and the weight of the whole plant is very moderate. The company report great success in the use of this engine.

The summer travel on all the railways reaching town has been noticeably heavy. The Old Colony trains have been run with full seats, and the August mileage on the New York, Providence and Boston Road was 7000 miles in excess of the record.

The new steel yacht *Valleymena*, building by the Herreshoff Mfg. Company for George S. Brown, of Baltimore, is receiving her machinery and will soon be launched. She is 148 feet in length, with an 18-foot breadth of beam and a 7-foot draft. Her engines, also built by the Herreshoffs, are of a quadruple expansion type and are beauties of simplicity and strength, capable of 800 horse-power. The woodwork is of highly polished quartered oak, and there are five water-tank bulkheads. She will cost Mr. Brown about \$70,000 as she comes from the Herreshoffs hands.

LEONIDAS.

Tests of Steel Eye-Bars.—The Edge Moor Iron Company have lately made a number of tests of steel eye-bars manufactured by Carnegie, Phipps & Co., of Pittsburgh. The diameter of the eye in all was 12½ inches, while the diameter of the pin-hole was 4.96 inches. The first two 15 feet long and the second two 18 feet:

	1.	2.	3.	4.
Per cent. excess, Eye A.....	59.6	56.8	56.1	62.5
Per cent. excess, Eye B.....	55.0	59.7	56.8	56.2
Size of bar.....	5 x 15-18	5 x 15½	5 x 15½	5 x 1
Length, back to back, of holes.....	ft. in. 16 11	ft. in. 16 11	ft. in. 20 11½	ft. in. 32 6¼
Elastic limit, pounds.....	36,520	36,700	36,740	39,550
Elongation of hole, A.....	0.35	0.54	0.75	0.74
Elongation of hole, B.....	0.40	0.76	0.56	0.57
Elongation 8 inches, per cent.....	41.2	39.2	39.6	37.5
Elongation total length, per cent.....	In 15 feet. 13.1	15.3	16.4	11.4
Reduction of area, per cent.....	51.5	49.0	46.7	43.3
Ultimate strength.....	64,030	64,680	66,140	63,700

The fracture of the first two eye-bars was capped and silky, while that of the second two was 45 per cent. silky. In the first the fracture took place 3 feet 11 inches from the back of pin-hole B; in the second, 3 feet 3 inches; in the third, 16½ inches from pin-hole A, and in the fourth, 2 feet 9¾ inches from pin-hole B.

The International Fair at Buffalo has given birth to an extraordinary newspaper sheet called the *Buffalo Express Extra*, comprising 60 pages, printed in a choice style of typography, and illustrating in its descriptions a large number of the business concerns in the city, stove manufacturers, engine builders, &c., as well as presenting photographic reproductions of a life-like character of several score of representative business men in all departments. Altogether, as a souvenir it is of no mean order, even in its historical features, which are duly set forth with maps, diagrams and reminiscences of early days, not omitting a portrait of Red Jacket, the Seneca Chief and orator.

Waterhouse Dynamo and Regulator.

In order to explain a new method of regulation in electric lighting for which patents have just been allowed, we illustrate on this page the system adopted by the Waterhouse Electric and Mfg. Company, of Hartford, Conn.

In Fig. 2 we show a Waterhouse dynamo with a closed circuit armature, A. On the commutator C are three brushes; *a* and *b* are the main circuit brushes and *c* the auxiliary brush. From the positive brush *a* the current passes to the conductor around the field magnets F to the resistance R. The current from the auxiliary brush *c* passes directly to the resistance R, leaving the field magnets out of circuit. The current from both circuits (field and local) joins at R and passes to the lamps, the current on the lamp line being the sum of the two. The amount of current in the field and local circuits is in proportion to the resistance R in each. The brushes have a fixed position.

There is in every dynamo a point of maximum commutation on the armature which changes with the resistance on the lamp line, moving with the rotation (toward brush *c*) when the resistance decreases and back when it increases. This affects the current in the local and field circuits as follows: When lights are turned out the line resistance is decreased and the maximum point moves forward and forces more current out of brush *c* and less out of brush *a*. This reduces the current in the field magnets and the E. M. F. in the circuit and consequently the power required to operate the dynamo. But the current on the lamp line remains constant, because the local circuit is increased proportional to the decrease of the field circuit. The remaining lamps therefore retain their full brilliancy, while the current cannot increase and destroy the apparatus. Thus the very tendency of the machine is to perfect regulation without the aid of a mechanism, but when to this is added the simple regulator, which makes the regulation instantaneous by assisting the current to pass out at brush *c* and opposing its passage around the field magnets by way of brush *a* when lights are cut out, and forcing it out at brush *a* around the field magnets by opposing its passage out at brush *c* when lights are put in the circuit, the efficiency of the method can be appreciated.

The regulator is illustrated by a slide in Fig. 2, controlled by a solenoid. Any tendency of the current to increase raises the contact, and the result is a decrease of resistance in the local circuit and an increase of the resistance in the field circuit. More current will therefore flow through the local circuit and less through the field circuit. The generating capacity of the dynamo is instantly reduced and any tendency to produce a current above the standard is overcome. Should the tendency of the current be to decrease, say by a reduction of the speed of the armature, the slide lowers, increasing the resistance in the local and reducing it in the field circuit. More current will then flow around the field magnets and less out on the local circuit. The generating capacity of the dynamo will therefore increase to maintain the current at standard. It should be stated that the use of resistance for balancing the field and local circuits is a small amount compared to that used by the lamps, and is not interposed, as can be seen, for the purpose of compensating for lamps turned off. The Waterhouse regulator varies the E. M. F. directly with the resistance of the lamp line, producing self-regulation and maintaining on the lamp line the standard current, whether one lamp or the full number are burning. By this method, as the lamps are cut out the

current is reduced in the dynamo. Fig. 1 represents the complete machine, to which this method of regulation is attached, and plants are manufactured from three arc lights and up. The light produced is very steady, and entirely satisfactory for inside or outside illumination, and it is now in

fastest vessel ever built by Cramps. Her hull is of beautiful design and all the power possible has been put in her. She is 246 feet long, 26 feet 5 inches beam, 14 feet deep; mean draft, 9 feet; displacement, 725 tons. Her motive power consists of two triple-expansion twin-

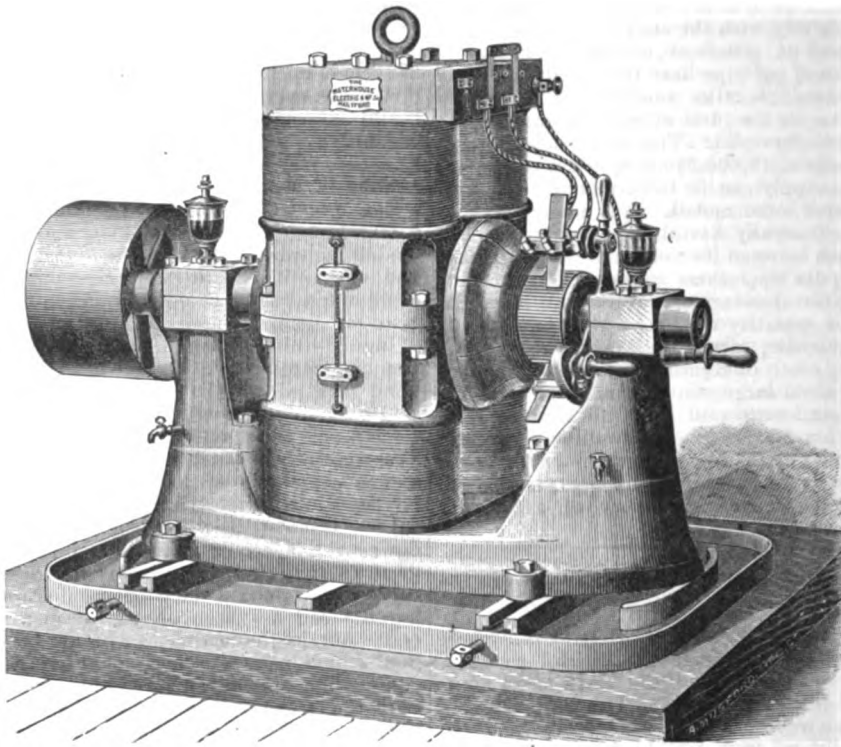


Fig. 1.—General View of Dynamo.

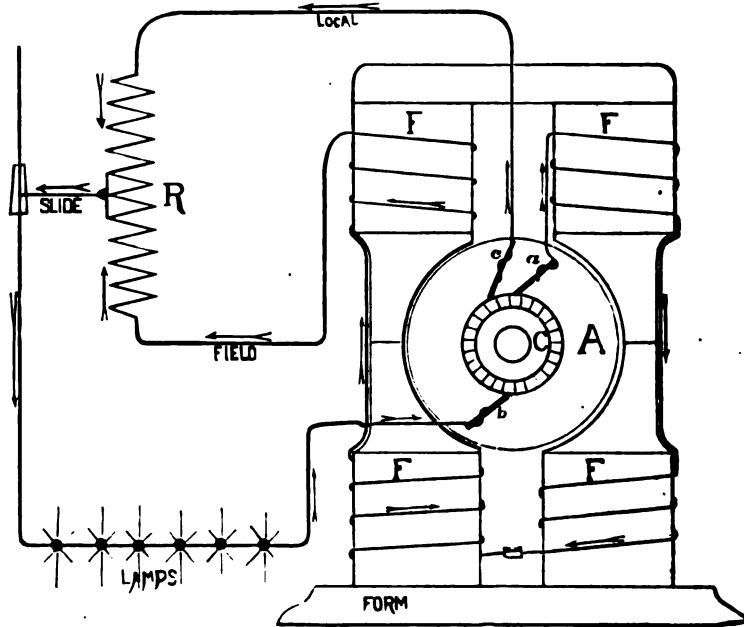


Fig. 2.—Details of Regulating System.

THE WATERHOUSE SYSTEM OF DYNAMO REGULATION.

use in a large number of the representative mills of the country.

The Dynamite Cruiser.—The dynamite cruiser Vesuvius is being finished, both below and on deck, and little remains to be done but to complete the apparatus for firing the pneumatic guns. The engines have been tested by dock trial and gave very satisfactory results at 220 revolutions per minute. This will doubtless be the

screw engines, developing about 3200 indicated horse-power. There are four cylinders to each engine, the high-pressure is 21½ inches diameter, the intermediate 31, and the two lower pressure cylinders 34 inches diameter. The engines are 20 inches stroke. There are four locomotive boilers 9 feet in diameter by 19½ feet long. They are to carry 160 pounds steam working pressure. The vessel is guaranteed to make at least 20 knots.

A Modern Boiler Works.

The boiler works of John Mohr & Son are located at 32 Illinois street, in the heart of a large manufacturing district of Chicago, and occupy a site having a front of 143 feet and a depth of 216 feet. Mr. Mohr, the senior partner, was formerly connected with the boiler department of other works, but withdrew in 1882 to operate independently. He has six sons, all of whom have been brought up in the boiler trade and who have charge of the several departments. At these works anything is built that can be made of plate iron and steel, but special attention is given to rolling-mill and blast-furnace work, and marine and general boiler work. Within the past year expensive machinery has been added, and further improvements are in progress.

Throughout the establishment the saving of labor is carefully studied. Heavy plates are carried from one part of the works to another either by overhead tramways or by elevators running between floors on different levels. As the plates are received they pass to the drillroom, then to the bending-room, next to the riveting-room, and finally to the finishing shop. The drillroom contains a number of the usual tools, but, in addition, there is a machine which will punch holes up to 6 inches in diameter through inch plate, or it can be used for punching holes of the smallest size. Power is furnished to operate the machinery in this and adjoining departments by a Corliss engine, 12 x 36 inches, built by the Weisel & Vilter Mfg. Company, of Milwaukee. From this engine rope transmission is used to convey power 83 feet distant to a shaft at the furthest end of the building in which it is situated. Six strands of 4-inch common manila rope are used. The rope, which is all one piece, runs noiselessly. The transmission plant was designed by T. S. Miller, of the Link Belt Machinery Company, Chicago. Iron sheaves are used.

In the bending-room are a set of rolls, a flue-welding machine and smiths' fires. The rolls, which were made by the Niles Tool Works, are claimed to be the heaviest in the country. The housings are massive; the upper roll is 24 inches in diameter and each of the two lower rolls measures 20 inches. The inside length of the rolls is 17 feet. An independent three-cylinder engine furnishes power. The flue-welding machine is intended to be used in welding short pieces of tube to the ends of tubes from which defective pieces have been cut, and does its work much better and more rapidly than it can be done by hand.

The riveting room is fitted up with a hydraulic riveting machine, built by Tweddell, of Gloucester, England. A tower, 52 feet high, extends above the riveter, in which boilers are raised and lowered vertically by hydraulic power, as well as moved laterally toward and from the machine, all operations being controlled by a workman standing on a platform by the side of the riveter. Rivets are heated in a furnace of original design, which will hold a keg at a time, heating them to a cherry red without danger of burning. The riveting machine exerts a pressure of 45 tons on the rivets and of 25 tons on the plates, forcing the latter together so closely that calking is practically superfluous. It is exceedingly interesting to watch a long boiler move vertically in front of this machine, which fastens rivets almost as rapidly as they can be put in place. A very slight pause is made after each one is flattened, sufficient to allow it to cool and retain its perfect set. The heads of boilers are riveted by hand, except when they are inserted reversed, in which case the flange is exposed and the hydraulic riveter can be used. In these works every hole in steel boilers is drilled, not punched.

The substitution of steel for iron in boiler-making is demonstrated very forcibly by the fact that in these works 99 out of every 100 boilers are made of steel. Otis steel is used unless other makes are specified by the purchasers.

The flanging-room contains a heating furnace and a flanging machine. The heating furnace is a reverberatory furnace large enough to hold a 12-foot plate. A buggy is used to convey the hot plates to the flanging machine. This machine will flange plates ranging from 24 inches to 8 feet in diameter, and was built by Joseph B. Blettnier, of Cincinnati. It is said to be the largest in the country. Flue holes are now flanged by hand, but a machine will shortly be in place for such work. A steam hammer is also to be added for forging irregular shapes. Among the new tools which have been ordered and will soon be set up in the works is an 18-foot plate planer being built by the Niles Tool Works.

The standard boiler made by Messrs. Mohr & Sons consists of two sheets only in the body. One sheet is used for the top and the other for the bottom, the lines of rivets running along the sides, so that no double thickness of plate is exposed to the fire. Very little work is done on boilers for stock, but nearly everything turned out is order work made under exact specifications. While a large part of their business is of local origin, the firm now enjoy a patronage extending from Pittsburgh to the Pacific coast, a great deal of boiler work now coming to Chicago from the far West which formerly went to other cities. Nearly \$200,000 have been invested in this plant up to the present, and from 150 to 175 men are regularly employed, who work up an average of 3000 tons of plates yearly.

The Sioux City Corn Palace.

Unique among the usual autumnal celebrations, expositions, &c., is the Corn Palace at Sioux City, Iowa, opened on the 24th inst., and to be closed on the 6th of October. In the building of the first annual corn palace last year no definite plan was adopted, but the working out of the details of the building and the beauties of the decorations came with the discovery of the artistic possibilities of the corn plant. This year it is different. Profiting by past experience, competent architects were secured, who prepared carefully drawn plans of the framework of the structure, and, taking these plans as a guide, artists sketched and prepared outlines of the decorations. The building erected this year is 150 x 150 feet in size, and occupies every inch of a quarter block of ground. At the southwest corner or main entrance rises the main tower to a height of 175 feet, while to the east and north are Norman towers, which support the Moorish pavilions. The roof of the main pavilion is shingled, thus insuring a dry interior. In the main tower there is a winding stairway, and from the top a view of the city can be obtained.

The great body of the outside is covered with ears of corn, sawed lengthwise through the center, and nailed with two brads with the flat or cob side next to the walls. To relieve the monotony, different colors are used, and white, red, speckled, purple and golden-yellow ears were obtained. The exterior is laid off into panels, which are plainly marked by the varied colors of the great Western product. Next to the ground is a wainscoting of corn stalks, stripped of their leaves and packed close together. The entrances, windows, &c., are also bordered with corn-stalks prepared in the same way. The railing of the towers is also covered with corn-stalks, and the long stalks of grain—wheat and oats—while the capstones of the

turrets are represented by the bushy heads of millet, bearded oats and sorghum seed. The windows of all the towers are latticed with corn ears strung on wires. Some are purple, some are red, others yellow, and still others white, giving that variety of coloring which is at once the charm and novelty of the general effect. The interior of the palace is decorated with striking originality. It is lighted by electricity, and is fitted with appliances for fighting fire, and has a perfect system of sewerage. The palace is built by an incorporation known as the Sioux City Corn Palace Exposition Company, having an authorized capital of \$250,000, the idea being to make the institution a permanent one. Over 50,000 bushels of corn and grain were used in its construction.

Industries of Knoxville, Tenn.

Knoxville, Tenn., does not boast of a boom, but its industrial progress is quite satisfactory to the inhabitants. The city is situated in the midst of a great agricultural country, and being near large areas of the finest timber and coal deposits it seems destined to become a very important inland city. The population has grown from 12,000 in 1880 to over 40,000 by actual count. It has few great manufactures to boast of, yet possesses ample water-power in the bold streams near by, particularly the Tennessee River. The city needs a few more railroads. Some are being built and others located. The East Tennessee, Virginia and Georgia have their construction and repair shops and general offices in Knoxville. This road is doing a heavy business, taxing the rolling stock to its limit, and necessitating heavier steel rails to be laid on part of the track. In their shops the company have built several locomotives complete, which are doing service regularly and are among the finest on the line.

The wholesale hardware trade of Knoxville is very large and important, carried on principally by George Brown, Woodward & Co., C. M. McClung & Co. and S. B. Luttrell & Co., and reaches into Virginia, the Carolinas, Georgia, Florida, Alabama and Mississippi. The marble quarries near the city are being rapidly developed, and are likely to acquire a national reputation, as the quality is excellent and the varieties of colored marble are numerous. The Knoxville Iron Company, of which Jas. R. Ogden is president and A. O. Brown is superintendent, is a well-equipped rolling mill. Mr. R. L. Ralston, of Eastern Pennsylvania, is general manager, and has instituted several improvements. The capacity of the mill is about 35 tons of finished iron per day, and they are now behind in their orders. The product is merchant bar, fish and angle plates and mine rails. The company have just had put in two Smith gas generators by Laughlin & Co., of Cleveland, which have proved successful. They are also trying the experiment of a gas generator under the boilers, the originator claiming economy of fuel and regularity in heat. Mr. Ralston uses the best grades of Virginia and Southern pig, and uses a local ore to counteract the cold short tendencies of the latter irons. The markets for their mill product are principally in the South and the States above referred to.

The programme which has just been issued for the ninth annual convention of the American Society of Mechanical Engineers to be held at Scranton, Pa., beginning on October 15, promises an enjoyable and a profitable meeting. A number of delightful excursions have been provided for and the list of papers and topical queries, as usual, is excellent.

The Iron Age

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DAVID WILLIAMS, - - - PUBLISHER AND PROPRIETOR.
CHAS. KIRCHHOFF, JR., - EDITOR.
GEO. W. COPE, - - - ASSOCIATE EDITOR, CHICAGO.
RICHARD R. WILLIAMS, - - - HARDWARE EDITOR.
JOHN S. KING, - - - BUSINESS MANAGER.

The Business Outlook.

The improvement in the volume of business during the past two months in the many departments of the iron trade, notably in the West, has given much encouragement. For the first time in a considerable period speculation has played a part in shaping events, although thus far in a moderate degree only. Still, it has led to exaggeration and a distinct effort through the press and other channels to create the impression that a notable rise in values is to come, possibly this fall, and surely next year. It would be idle to deny that such a feeling does not exist outside of purely speculative circles. We have noticed it cropping up repeatedly among manufacturers and merchants both in the East and West. We know of cases in which owners of plants have entered into extensive contracts for improvements and enlargements, with the avowed purpose of being ready to take advantage of the rising tide. In other instances plans have been matured with a similar object in view, though their execution is held in abeyance contingent upon the happenings of the next two months. The basis of convictions leading to such preparations is the broad fact that with a growing population, and after years of retrenching, we are developing a consumptive demand of enormous proportions. Spasmodically the evidences of it have come during the past two years. It needs only one great general impulse, like good crops and fair prices for agricultural products, to cause first a rapid replenishing of stocks in the hands of middlemen, and then the scramble for increased quantities of goods, to cause a sudden rise. There are many who reason that the conditions are favorable to such a movement, and some who have already begun to set their face against any rush which may prove disastrous to legitimate interests in the long run.

As yet this feeling that we are on the eve of a "boom" is vague, but it is shared by many and is being acted on by some. From time to time some unfavorable development shakes the faith of those who are sanguine, but it is noticed that its influence is short-lived, while favorable events make a deeper and more lasting impression and make new converts while strengthening the faith of the more hopeful. It is conceded on all hands that the volume of business is unprecedented. Crops have been bountiful and promise to bring better prices than have been secured for years. The enormous coal tonnage indicates great activity in manufacturing added to increased consumption for domestic purposes. The shipments of Lake ores are heavier than was thought possible in the spring. Freight rates, while demoralized in some very important sections, show some tendency toward im-

provement, and with the enormous traffic handled may soon react in response to further additions to it. With a little more money in the treasury this would bring heavy purchases for new equipment and much needed renewal. In our iron and steel works, our foundries and machine shops, our mines and manufactories, we have gradually but steadily been creeping up to capacity. There is still much margin for increased output by urgent crowding, but as that point is reached the indifference of the seller grows and the raising of prices comes naturally.

Let it be conceded that enormous amounts of money were directed into permanent investment by the phenomenal railroad building of last year. It must be acknowledged that as yet the additions to mileage have been more a burden than a source of revenue to the great lines who undertook them. Yet money is plentiful in all our financial centers and there are many meritorious undertakings awaiting the time when capital will be forced to look for employment at better terms than are now generally offered. It is not to be expected that enterprise will seek new channels of activity while the minds of the majority of our citizens are largely occupied with political responsibilities, while many captains of industry earnestly and honestly believe that the outcome of the struggle now being waged almost exclusively over economical questions must seriously affect our industrial prosperity if it is adverse to their political beliefs. We may suffer serious drawbacks after that contest is decided, but even with all such contingencies to check or to reverse the incipient movement, the outlook is decidedly hopeful. The developments of the early winter must determine whether 1889 is to be a year of exceptional prosperity or not. This question, which is now agitating the minds of a few, may soon become the all-absorbing subject of thought and find more general expression in active preparation.

The pressure of heavy traffic upon the Western railroads which was predicted for the fall months is now being felt. Already such a scarcity of cars has developed that complaints are numerous among shippers. The railroads centering at Chicago are nearly all suffering on this account, and could greatly increase their business if they could get the necessary rolling stock. The railroad companies largely interested in distributing coal are doubly hampered, being pushed by the great demand for coal at this season of the year and urged to supply increased facilities for the transportation of grain to market. Eastern connections of the Western roads are being drawn upon for all the cars that can be spared for this increase in traffic, but the relief derived from that source will only be temporary, as the Eastern roads will probably soon need all their cars themselves. Many Western railroad managers foresaw this condition of railroad business several weeks since, and earnestly advised the people living along their lines to lay in their supply of coal early, as the pressure upon the facilities of the roads promised to be something enormous when the crops began to be moved. This condition of the railroads promises to be of considerable benefit to the iron trade. Large orders are pending for new cars, requiring

considerable quantities of iron and steel, and others will follow as rapidly as the railroad companies find that they must increase their equipment. The expansion of railroad business will probably be of sufficient duration to also enable the companies to accumulate a fund toward the purchase of rails for renewals, now badly needed on many lines, even on some of the most important Western roads.

Our Imports of Iron and Steel.

From England and the Continent come steadily better reports of the improving condition of the iron, steel and allied trades. Americans who have returned from abroad, men who possess exceptional facilities for correctly gauging the feeling prevailing, report that the activity in the leading industrial centers is very great, indeed, and that the advancing tendency in prices is gaining. Nearly a year since *The Iron Age* pointed out that a higher level of values could only be attained after the demand from other markets had more than compensated for the falling off in shipments to this country. With the aid of English export statistics we showed months ago that that point had been reached. The latest returns emphasize this. While generally speaking the English exports show an improvement only in some lines, the shipments to other countries outside of the United States have increased. Thus we have for the first eight months:

English Exports of Iron and Steel, Eight Months, Gross Tons.			
	1888.	1887.	1886.
<i>Pig Iron:</i>			
Total.....	688,532	955,922	711,358
United States.....	230,251	238,736	100,225
Other countries..	458,281	717,186	611,133
<i>Bar, Angle, Bolt Iron:</i>			
Total.....	153,013	165,418	195,562
United States.....	2,284	1,809	3,274
Other countries..	150,729	163,609	192,288
<i>Railroad Iron, all sorts:</i>			
Total.....	502,250	642,543	703,978
United States.....	21,746	112,531	39,582
Other countries..	480,504	529,712	664,396
<i>Steel Rails (included in above):</i>			
Total.....	334,350	483,908	482,523
United States.....	21,114	110,239	38,321
Other countries..	313,236	373,709	444,202
<i>Wire:</i>			
Total.....	26,892	27,748	42,981
United States.....	2,957	2,594	1,810
Other countries..	23,935	25,154	41,171
<i>Hoops, Plates and Sheets:</i>			
Total.....	198,608	220,327	270,447
United States.....	13,758	21,081	28,082
Other countries..	184,850	199,246	242,365
<i>Tin Plates:</i>			
Total.....	232,738	235,901	263,583
United States.....	186,490	179,236	196,338
Other countries..	46,278	56,665	67,174
<i>Old Iron and Steel:</i>			
Total.....	94,299	205,010	100,491
United States.....	33,944	147,662	16,190
Other countries..	60,355	57,348	84,301
<i>Unwrought Steel:</i>			
Total.....	73,641	214,708	100,372
United States.....	36,895	170,224	45,803
Other countries..	37,746	44,484	54,569

With the exception of hoops, plates and sheets, and of tin plates, the figures of exports to the United States show a marked reduction. Nor is this confined to our imports from Great Britain, as the following import statistics of our Bureau of Statistics for the first seven months, in gross tons, clearly show:

American Imports of Iron and Steel.		
	1888.	1887.
Iron ore.....	332,240	684,582
Pig iron.....	112,989	280,888
Scrap iron.....	31,267	219,736

Scrap steel.....	6,372	20,726
Bar iron.....	14,572	20,373
Rails.....	49,128	53,065
Cotton ties.....	7,811	6,696
Steel hoops, sheets and plates	13,244	15,437
Steel blooms, slabs, billets and bars	66,104	210,581
Sheet, plate and taggers iron..	3,265	3,063
Tin plates.....	173,537	168,359
Wire rods.....	67,821	98,523
Wire and wire rope.....	1,969	1,449
Anvils, axles and forgings.....	849	861
Chains.....	491	442

The English figures quoted above are particularly interesting, however, as proving that, deducting the quantities sent to this country, the balance, which represents the English exports to the rest of the world, shows a notable betterment in the demand. While in some lines this has not yet compensated English iron-makers for our lessened purchases, it does prove that their position as sellers has grown more favorable. This has already found expression in higher prices and in a revival of speculation for an advance. To us the importance of this fact lies in the circumstance that it raises the limit which we may reach in values before inviting heavily increased shipments. Should a rapid expansion in the demand here ultimately cause heavier buying abroad, then its addition to a good business with other countries would accelerate an already rising tendency. This is an additional circumstance which would place an upward rush here within the range of possibilities. It is a point which should be carefully considered by buyers and sellers alike if the swelling demand in this country should in the next quarter assume proportions which a few anticipate and many do not consider impossible.

Chicago and St. Paul Freight Rates.

The matter of the Chicago, St. Paul and Kansas City Railway, just decided by the Interstate Commerce Commission, has some interesting features. This railroad asked for a ruling permitting it to make higher rates to intermediate points between Chicago and St. Paul or Minneapolis than is charged upon through traffic to and from the same points. This was asked upon the ground that a rival line was quoting these low through rates, though not earning operating expenses, and that the road in question should be allowed to compete for this through business without lowering local charges to the same level, or else the C., B. and N. should be compelled to advance their supposed ruinously cheap tariffs. Neither of these points was acquiesced in by the commission. The Interstate act was passed, they say, for the protection of the public and not to help one road against another, it being supposed that the carriers would arrange their own tariff matters and protect themselves.

In our way of looking at the case, the defending railroad did not make the best possible case of its low through and locally higher rates, and perhaps the omission was partly intentional. The reason of the low rates on the C., B. and N., which caused all the trouble, is given by the traffic manager of that road as "owing to the extremely low rates prevailing by Lake Superior lines." This seems to be almost the only mention of water competition made at the hearing, and yet it is the most potent cause of the whole trouble. If the traffic concerned only the

cities of St. Paul and Chicago the matter would be simple enough, but the seaboard cities and the chain of waterways must be taken into account. Minneapolis flour and grain, destined for the East or for export, will pay no more via Chicago than via Duluth or Sault Ste. Marie, and the railroads between Minneapolis and Chicago cannot, therefore, maintain for any length of time any rate much higher than the rate to Lake Superior. In the same way, the rate on return shipments from the manufactories must be correspondingly low. When the through rate from New York to St. Paul, via rail to Buffalo and lake to Duluth, is on first class but 50 cents (not including insurance), and the rate from New York to Chicago is 35 cents, it seems plain that on traffic from the East for the Northwest the C., B. and N., or any other road, cannot get 60 cents, no matter whether anything less would be a losing rate or not. The true defense, therefore, it seems to us, would have been just such competition between rail and water carriers as the Interstate Commission had already decided constituted the differing circumstances allowing differing rates. It is, of course, true that all the traffic passing north from Chicago does not originate east of that great city, and it would be interesting, for many reasons, could we know what proportion of this business is actually made up there, excluding such goods as have been sent to Chicago from New England or Pennsylvania and reshipped by jobbers or from warehouses. No doubt such reshipments constitute a very important part of the total traffic. But even of the goods manufactured in the great works of that city it can be said that they must be sold in the Northwest in competition with goods made further East, but which have had the advantage of this cheap lake carrying. So, from whichever point of view we look at the problem, the importance of the waterway is seen.

Another point in the matter is that an evident way of escape was not even mentioned and that is the making of a through rate between New York, or Boston, or Pittsburgh and the Northwest, a rate which could be less than the rate to Chicago plus the rate from Chicago to St. Paul. This would have enabled the Chicago, St. Paul and Kansas City to have collected a low rate on competitive water traffic, while charging on the business originating at Chicago a higher rate. No suggestion of such a plan was heard from the lips of any of the railroad men. This fact speaks volumes for the strength of Chicago's influence and for the alertness and enterprise of her business men. A moment's thought will show the severity of the blow such a plan would strike against her jobbing trade. As the case now stands Chicago is a basic point for rates. Tariffs are so constructed that everything manufactured in Pennsylvania or elsewhere can be shipped to Chicago, resold, and shipped to points further West without any additional charges for the break at Chicago. If now it be once admitted that this rule must on any account be broken and the rate from New York to St. Paul be lower than the rates charged to Chicago and out again, then the wholesalers of that city lose control of so much trade. As remarked before, it is most significant that railroad man-

agers will appeal to Washington on purely technical grounds for permission to charge the small towns a high rate, but will not one of them whisper that exactly this thing can be done if only they will charge Chicago shippers as high as the local dealers, and higher than manufacturers further East. It may yet happen that these Chicago-St. Paul railroads will be forced to recognize the facts of the water competition by the lakes and meet the through competition between the seaboard and St. Paul by a through route, but this will not be done at present. The influence of Chicago is too firmly established. It was a knowledge of this fact which caused the building of the Soo line as "an anchor to windward" by the Minneapolis millers.

Our Trade With Japan.

Our domestic export to Japan has increased so much recently under the impulse of growing prosperity in that country, that an examination of the financial reforms and industrial expansion going on there may be useful. One of the greatest drawbacks with which Japan had to contend was the paper money; in 1885 specie payment was resumed after the paper money had depreciated 45 per cent. of par. Confidence was restored, and the Government finances since then took an even course. During the nine months that followed resumption, fiscal year 1885-86, the income was \$56,622,173, and the outlay \$56,620,275; in 1886-87 the respective figures were \$74,695,415 and \$74,689,014, while the budget estimate for 1887-88 fixes the revenue at \$79,936,870, and the expenditure at \$79,935,553. The national indebtedness is large, amounting on July 1, 1887 to \$249,108,578, but with the exception of \$7,522,032 it is internal, and the Nakasendo Government railroad represents \$20,000,000 of it. In the budget the army figures with \$12,045,994 expenses, and the navy with \$12,006,052. In order to maintain her independence against China, Japan has an army whose effective strength, rank and file, is 54,388 men, and a navy ready for operations of 221 steamers, with a joint tonnage of 40,090 and 50,979 horse-power, one of them being an armored vessel. As per census of January 1, 1886, the native population at that time was 38,151,217, the area being 382,418 sq. km., and there were 7117 foreigners, 4143 being Chinese, 1423 Englishmen, 592 Americans, 343 Germans, 198 Frenchmen, and 418 of other nationalities.

Greater progress would have been made in railroad building if foreigners had been allowed to engage in it direct; for this very reason a speedy revision of the treaties with foreign nations is much to be desired. Up to last year the Government alone built the railroads, and 870 miles went into operation, a start having been made in 1868. In 1887 there were 151 miles added, 11 domestic companies being formed, with a joint capital of \$32,000,000. The first lines which the Government built cost \$50,000 per mile, but the present cost of construction is only \$18,000. The Japanese Railroad Company paid in 1887 a 10½ per cent. dividend, the operating expenses averaging 45 per cent. of the gross earnings. In 1885 the Government negotiated an 8 per cent. railroad loan, the one above alluded to, which was

quickly taken up. Japanese engineers made the surveys, and all of the employees are natives, yet mistakes and accidents are of rare occurrence.

Marine stations for the navy are multiplying. At Kure, a few miles distant from Hiroshima, an extensive station is being constructed in connection with a lagoon, and the dock frontage is to be $1\frac{1}{2}$ miles; a smaller station is in course of construction on the west coast of Kinshin, in the vicinity of Nagasaki; while the island of Tsu-Shima, in the Straits of Corea, is being strongly fortified. The large cities are fast being provided with water-works, and Yokohama has a new aqueduct, which was finished in October last. Harbor and river improvements are being actively pursued at a number of points.

Some 20 years since Japan could not boast of the existence of any native mercantile or industrial companies, the feudal system preventing their formation till then. Last year, in three cities alone—Tokio, Osaka and Kioto—no less than 111 companies were formed, with a joint capital of \$21,500,000, while 13 banks increased their capital by \$18,000,000. Adding thereto the \$32,000,000 of the 11 new railroad companies, it appears that \$71,500,000 in shares were subscribed for among the people in a single year, or about \$2 per capita. The new companies al-luded to built new factories, &c., chiefly for cotton and paper mills, dyeing establishments, glass factories, wood-working shops, works for the preparation of tea and silk for export, express companies, machine shops, truck farming, horticultural and fishery enterprises, china, lacquer-ware and bronze goods factories, brickyards, ice houses, manufacture of artificial manures, all leading to new enterprises. On December 31, 1886, there were in operation 22 cotton mills, containing in all 76,000 spindles, turning out 1,320,000 pounds of twist. In 1887 their number was increased by eight large mills, with 117,000 spindles. The Japanese cotton crop yielded last year 7676 tons, but this year the crop will be more bountiful, the Government having stimulated cotton culture by advancing money to small farmers. Till now Japan had to import cotton to a notable extent. It is hoped that soon there will be no necessity for it nor for importing twist from Bombay and cotton goods from Manchester. A brewery is to be built at Tokio, the share capital being \$150,000; the capital of the Tokio Electric Light Company is to be increased \$500,000 in a couple of months, and that of the Cattle Breeding Company \$300,000. Japanese workmen are skillful and wages low.

In 1887 the foreign trade of Japan reached a total of \$95,000,000, being an expansion of 86 per cent. within a decade, for in 1877 it did not exceed \$51,000,000. The total trade between Japan and the United States amounted during the nine fiscal years 1870 to 1878 together to \$84,059,000; during the last nine fiscal years, 1879 to 1887, it reached a total of \$147,827,000, an increase of about 75 per cent. During the calendar year 1887 the American trade exhibited the figures below as compared with 1886.

	Import.	Dom. exp. to Japan.
1887.....	\$17,742,288	\$4,150,777
1886.....	17,012,688	2,774,622
Increase in exports to Japan.....		1,376,156

In the fiscal year 1887 we shipped to Japan 21,983,462 gallons of refined petroleum, and received thence 2,312,179 pounds of crude camphor, 15,993,843 pounds of rags, 2,165,329 pounds of raw silk and 39,269,448 pounds of tea. Silk production increases rapidly in Japan, and so does the manufacture of silk goods. In a couple of years, when the new railroads are in operation and tap the most fertile tea districts, together with those where mulberry trees and silk worms flourish best, Japanese progress will not unlikely become still more astonishing. With growing prosperity the Japanese will take American goods more freely, the more so as we take nearly all her tea, and year after year more silk. This is all the more gratifying since the initiative of the American nation threw Japan open to international intercourse and civilization.

OBITUARY.

J. G. BRILL.

John George Brill, president of the J. G. Brill Company, and founder of the Philadelphia Car Works, died on Saturday morning at his home in Philadelphia, after an illness of more than six months. Mr. Brill established himself with his son, T. Martin Brill, in a small way, in the business of car supplies on Chestnut street, and later on, as their means increased, gradually drifted into the building of tram cars, and afterward into the manufacture of all classes of railway cars. In 1872 they obtained the first large order of railway cars that came to this country from Mexico, and since that time have made the greater portion of all the cars ordered from that country. The demand for their cars came not only from all parts of this country, but also from Europe, Asia, Australia and Central and South America. At present 40 per cent. of orders received are for foreign account. Mr. Brill introduced many novelties in the manufacture of cars, and was a thorough and conscientious mechanic. He was prouder and more ambitious regarding the good quality of work than money getting. He considered his greatest triumph the obtaining of the highest award, a gold medal, for the best tram car at the Exposition of Railway Appliances, in Chicago, in 1883. Mr. Brill was born near Cassel, Germany, in 1817.

WILLIAM MILLER.

William Miller, one of the oldest and best known iron manufacturers in the West, and chairman of the Miller Forge Company, Limited, of Pittsburgh, died on Friday evening, the 21st inst., at his home in Allegheny City, Pa. He had been suffering from typhoid malaria for nearly three months.

William Miller was born at Duntochar, near Glasgow, July 21, 1820, and came to America in 1849, connecting himself with the West Point Foundry, at Cold Spring, on the Hudson River. In 1855 he returned to Scotland, with some intention of again permanently locating. At this time he was employed in the works of the Dennys, near Dumbarton, where the famous Clyde steamers were built. He returned to America in 1858, and, passing through Pittsburgh on a trip West, was suddenly led to a determination to settle there with J. P. Haigh, in the West Point Forge, on Water street. This was afterward merged into the Duquesne Forge, on First street and Duquesne way, in 1860, where Mr. Miller became sole proprietor in 1864. During the war some of the most important forgings used by the Government

were made here. In 1882 the business was still further enlarged and a new building put up at Rankin station, on the B. and O. R. R., under the name of the Miller Forge Company. He leaves a widow and six children, four daughters and two sons, William I. Miller, vice-president of Glenwood National Bank, at Glenwood Springs, Col., and Humphries Miller, secretary and treasurer of the Miller Forge Company.

WILLIAM BAROGWANATH,

a prominent boiler manufacturer of Chicago, died on the 20th inst., aged about 70 years. He was the senior member of the firm of William Barogwanath & Son, well known throughout the Northwest.

CORRESPONDENCE.

The Life of Iron Roofs.

MARSHALLTOWN, DEL., September 17, 1888.

To the Editor.—Since the article, "The Life of Iron Roofs," appeared in *The Iron Age* I have received numerous inquiries for further particulars concerning the roofs alluded to. If it will interest your readers please say the sheathing used was made of stock boards laid as closely as possible. The under side of the metal had two good coats of paint, but was not otherwise protected, and, as far as I can observe, has not rusted. The gauge of iron used was No. 26. The cleats on the standing seams are not exposed. Mr. Caleb Marshall, who owned this property from 1837 to 1861, informs me that I made an error in my statement on August 16, in that the barn roof was put on in 1840, and not in 1846. I have about 75,000 square feet of iron roofing, which, after many years of service, has been very satisfactory.

Yours respectfully,

J. R. BRINGHURST.

The Alaska Commercial Company.—

The operations of the Alaska Commercial Company receive further attention from Chester Seeber, of San Francisco, formerly United States Commissioner for Alaska, who has written a letter for the purpose of showing that the company uses the power acquired under its contract "to monopolize the whole trade of western Alaska, oppress the inhabitants and to retard the development of the country." Mr. Seeber says the geographical conditions of western Alaska render the country impenetrable, except by navigation of its vast rivers, which flow westward into Behring Sea. All the commerce of the country flows through this sea and past the seal islands of St. Paul and St. George, which are held by the Alaska Commercial Company. Revenue steamers, he says, are kept at the expense of the Government throughout the summer months, constantly in attendance about the seal islands, and any unfortunate vessel discovered in Behring Sea is searched and if found to contain any furs, no matter where or how obtained, is seized and subjected to condemnation and sale. This arbitrary action, he says, on the part of the Government practiced at the solicitation and by the procurement of the Alaska Company, renders any attempt, however lawful, of any individual to do any trading with the country perilous and in most cases results in irreparable loss. Mr. Seeber endeavors to show that the company have substantial reasons for wishing to maintain its primeval domains undisturbed.

The search for the treasure ship sunk long ago off the Delaware breakwater has been abandoned. The only trace of metal discovered was verdigris from supposed contact with copper sheathing or a gun.

Washington News.

(From Our Regular Correspondent.)

WASHINGTON, D. C., September 25, 1888.

The Sub-Committee on Finance at last submitted their tariff bill to the full committee to-day. Owing to some undetermined points as to the amount of reduction on certain articles the committee determined to withhold their schedules from publication until they could have a further consultation and also to enable them to perform the courtesy of submitting their bill to Senator Beck, who is in poor health at Fortress Monroe. A full copy of the bill was prepared and placed in a sealed packet and intrusted to a deputy sergeant-at-arms to be conveyed to Senator Beck. It is expected that the acknowledgment of the Senator will be received by Thursday, at which time the committee will have another meeting.

The aggregate results of the differing views of the majority are as follows:

Total repeal of tobacco tax.....	\$30,000,000
Repeal on manufactured tobacco.....	25,000,000
Total repeal of duty on sugar.....	56,000,000
Fifty per cent. reduction.....	28,000,000
Repeal of tax on fruit brandy.....	1,500,000
Repeal on alcohol used in the arts....	6,000,000
Reduction of duty on manufactures caused by equalizations and readjustment.....	10,000,000

There is also a cut of 50 per cent. on rice, which would add, approximately, \$8,000,000.

The maximum reduction proposed is: Repeal of internal taxes, \$83,000,000. The minimum reduction proposed is \$70,000,000.

It is the reconciliation of these differing views which may consume some days. The general disposition, however, is to permit certain features, such as the amount of reduction on sugar and rice, if any, and tobacco to be determined in open Senate.

Owing to the continued indisposition of Senator Beck, Senator Harris has been selected to prepare the minority report. He informed the committee that it would require several weeks for him to complete the task. There is a very general disposition on the part of the Democrats to enter into a full discussion of the Senate bill, in contrast with the Mills bill. The metal schedule has been prepared in conformity with the views of representative men in the different branches. The reductions are stated by members of the committee as not being material in any case. The unification of iron and steel duties as far as practicable is said to be the most important change, and is claimed not to result in much of a reduction.

The duty on tin plate remains at its present rate of 1 cent a pound. The committee were favorable to the increase required to place that article on a protective basis, but could not see their way clear to such a step when public sentiment has not yet recorded itself on the opposite positions held by the two great parties now marshaling for control of the administration of the Government for the next quadrennial period. Lumber remains at present rates and wool is unchanged, except an increase of 1 cent on the finer grades. Mr. Cramp has had a conference with Chief Constructor Wilson, in which he stated that owing to the floods it was impracticable to extend the ways so as to increase the precautionary measures taken to insure a safe launching of the cruiser Baltimore, next Saturday.

The recent rapid advance in the price of old iron rails, coupled with the cheapness of new steel rails, would seem to present a very favorable opportunity to railroad companies for renewing their tracks. Some of them have taken advantage of this condition of affairs, but the business thus cre-

ated has by no means assumed the proportions naturally to be expected. In the case of Western railroad companies the reason assigned for their non-action is their inability to raise the necessary cash to purchase new steel rails as a preliminary step toward taking up old iron rails. Here is an opportunity for the intervention of financiers who will advance the purchase-money for new rails and take in payment the old rails and a cash difference to be agreed upon. We are informed that Chicago parties are ready to make such an arrangement with railroad companies of good repute, and there are probably other agencies which would be willing to handle business of this character if application was made to them. The steel-rail manufacturers are anxious for orders, but they cannot afford to engage in financial operations of this sort to a great extent. They would be obliged to search for buyers of old iron rails and would probably be at a disadvantage in this respect when competing with those who make a specialty of the old-rail business. The suggestion herein conveyed may be of benefit to both manufacturers and consumers of steel rails.

Bells in History.

Bells have a large place in history, almost larger than any other object that could be mentioned unless we must except some of the implements of destruction. Their great antiquity, says *Lock and Bell*, is beyond question. An explorer among the ruins of Ninevah, or some other of those vanished Oriental cities, claims the discovery of a bronze bell, and the citizens of Rome came together in their public places at the signal of bells. But the Roman bells were elongated pieces of forging about as musical, it is to be presumed, as a modern cow bell. It was not until mediæval and modern times that the bell ringer became a man of very distinguished duties. Who has not heard of the Sicilian Vesper bells, rung in the year 1282 as a signal for the death of 8000 Frenchmen, slaughtered so that Sicily might be free? Who has not heard again, and shuddered as he listened, of the bells of St. Bartholomew, the signal, it is said, for the death of 100,000 persons? And the 8 o'clock curfew bell that rang through all England at the bidding of William the Conqueror, as a warning to his newly-made slaves to "douse the glim;" has it not echoed in faint and still fainter tones through all the pages of English history down to date? But it has not been the fate of all bells to be made to give the signal for slaughter or oppression. The Philadelphians have their fondly cherished Liberty bell. It is held in such esteem that it was borne half over the continent a few years ago under the escort of a guard of honor to protect it from all injury. It proclaimed once from its brazen lips the birth of a new nation, and hence if it be not made to endure as long as the nation itself it will be because metal is more perishable than the work of the Revolutionary architects.

Curious Guns.—Among the many things to be seen at the United States Museum, at Washington, are two guns which exhibit the most elaborate workmanship. They were presented to Thomas Jefferson, not by the Ahkoond of Swat (he is dead, poor fellow), but by the Emperor of Morocco. The first is a flint-lock musket, 77 inches long, smooth bore; the barrel is of steel, and for half its length is octagon; the remainder is round. The stock is of oak inlaid with arabesque design in gold covering the woodwork. Six bands of gold hold the stock and barrel in place. The flint-lock is of a peculiar pattern, heavily inlaid with gold, also of arabesque pattern. There is no trigger

guard. On the butt there is a solid gold plate. The ramrod is ebonized, headed with a gold plate a foot long, altogether a costly and magnificent piece. No. 2 is a Moorish flint-lock musket, smooth bore, steel barrel, in shape octagon the entire length. The whole gun is 5 feet 8 inches long. The barrel and stock are connected with three silver bands. On each side of the stock are double rows of pear-shaped coral ornaments inlaid in solid silver bands. There is a solid gold plate on the butt, which is inlaid with a thick silver plate. The ramrod is coral ornamented with silver. This gun is also a present from the Emperor of Morocco to President Jefferson.

A Capillary Steam Boiler.

At a recent meeting of the French Society of Civil Engineers, in Paris, M. Serpollet described his new tubular boiler, for which he claims that it cannot possibly explode. The boiler consists simply of a solid-drawn steel tube, which has, with the exception of its two ends, been rolled out flat, so as to leave in it a channel only 0.1 to 0.3 mm. wide. The tube is then coiled spirally, and its inner end is bent up vertically to receive the steam pipe, while the feed-pipe is screwed into the outer end of the spiral. This spiral tube boiler is placed into a furnace, which may be of the slow combustion type, and there is no need for either stop valve, blow-off cocks, gauge glass or safety valve. The feed water, upon entering the capillary channel within the tube, is instantly converted into steam, and issues perfectly dry. The tube of a 1 horse-power boiler is 6 feet 6 inches long, and when flattened out 4 inches wide; its total heating surface is about 5 square feet, and it is said to evaporate 45 pounds of water per hour, with a consumption of 9 pounds of coal. The supply of steam to the engine is regulated by regulating the amount of feed water sent into the boiler, and for this purpose the inventor arranges the regulator of the engine either to act upon the waste cock of the feed pump or upon a sliding block, by which the stroke of the feed pump is altered. There being practically no water in the boiler, the regulation is said to be as precise and quick as with the usual types of engines. To stop the engine it is only necessary to close the cock on the suction-pipe of the pump, or open the waste cock fully. A few days after M. Serpollet had brought this boiler before the Société des Ingénieurs Civils, he showed the application of it to a steam driven tricycle in the streets of Paris. The boiler was carried behind the axle of the main driving wheels, and the engine was fixed under the rider's seat, which also contains a supply of water and fuel. A speed of 6½ miles an hour was attained over roads having 1.5 per cent. grades. The weight of the tricycle in service, but without the rider, is 3½ cwt.

The plant now employed on the Manchester ship canal includes 98 locomotives, 3221 wagons, 51 steam navvies, 49 steam cranes, and 104 pumping and other engines, with 161 horses and 8568 men and boys. Almost the whole of the land required for the construction of the canal has now been acquired by the company.

An interesting experiment has been made at Toulon, with the object of demonstrating the utility of a captive balloon in observing from a considerable height the movements of an enemy's fleet. A naval officer seated in the car of a balloon was in telephonic communication with the frigate *Indomptable*, to the commander of which he signalled, as if in actual warfare, all that he could observe from his elevated position.

Wages at the Edgar Thomson Works.

The Pittsburgh newspapers report the wages earned by the men at the Edgar Thomson steel works of Carnegie Brothers & Co., at Braddock, Pa., for the month of August, on the sliding scale based on a selling price in that month of \$31.50. Good machinists now make on an average of \$82 per month, or about \$2.90 per day. No machinist makes less than \$2.50 in 10 hours. For night work they get time-and-half-time, and for Sunday work they are paid double. Machinists' wages, and those of the blacksmiths are the same as they were last year. The latter make \$70 a month, or about \$2.50 per day. Blacksmiths' helpers' wages range from \$1.50 to \$1.60 per day of 10 hours.

The converting-millmen were even surprised themselves in receiving the amount of money they did for the month of August. It is true that a great many of them work 12 hours, but the amount of money they received in excess of that for any month of 1887 had a tendency to make them feel just so much better on pay day, and they were wholly satisfied. All over the converting mill, from the troughman to the scrappers, the wages are in advance of those of 1887. The latter work 12 hours, and were paid for August \$1.62 per 100 tons. In 1887 they got \$1.90 per 100 tons. The quantity of steel that can be turned out in 12 hours is so much in excess of that turned out in eight-hour turns that their wages for last month were much bigger than for any month in 1887 before the sliding scale went into effect. Scrappers' wages for the month of August were \$212.37, or \$8.13 per day.

The foremen of the cupolas were paid \$1.40 per 100 tons. They made \$184.14 in August, or an average of \$7.87 per day. Their helpers are paid \$2 per day. The exact earnings of vessel foremen could not be obtained, but their wages are not less than \$100 per month. The troughmen got 92 cents per 100 tons, and made \$121.20, or an average day's pay of \$4.27. The ingot pourers worked eight hours at \$1.40 per 100, and made \$122.76, an average of \$4.25 per day. The pull-arounds were paid \$1.10 per 100 tons, worked eight hours and made \$96.14, or very nearly \$4 per turn. Steel blowers got \$1.14 per 100, and made \$99.63, or an average day's pay of about the same as the pull-arounds. The pulpit boys got 82 cents per 100 tons. They work 12 hours. Last month their net earnings were \$71.66 each, or about \$2.80 per day. The bottom-makers in the converting mill made an average day's wages of \$5.50 in 12 hours. Their helpers are paid by the day, and receive only ordinary laborers' wages.

The employees of the blooming department made better wages than in any previous month since the erection of the works. Of course they all work 12 hours. The foreman and salaried men's wages are known only to themselves and the firm. The first helpers received \$1.39 per 100. They made \$157.66, or over \$6 per turn. The second helper got \$1.02 per 100, and made \$126.94, or about \$5 a day. The lever boys in this department made \$40.25. The men who worked about the shearers got 91 cents per 100. Their month's pay amounted to \$103.22, a fraction less than \$4 per day. The chippers at the hammer were paid the same as the second helpers in the blooming mill, and the helpers at the hammer received the same as the shear-men. The rollers in the blooming mill are salaried men, and only work eight hours. The table men get \$1.13 per 100. Their month's pay footed up \$128.17—about \$5 per day. In the rail mill there is no distinction made, except with the rail straighteners and gaggers, who work eight hours. All the rest work 12. The amount they get per ton is something less than what

they received during 1887; but, by working 12 hours, they were all able to make wages that even excelled those of any month during the year of 1887. The rail mill heaters last month were paid \$1.48, and made \$153, almost \$6 per day. The buggy boys are paid \$2 per day. The lever men at the roughing rolls got \$2.40 per day; the lever men at the short rolls, \$3.50, and the guide setter at the finishing rolls, \$3 per day; first helper on hot bed, \$2.40; hot bed, second helper, \$2. The rail straighteners worked eight hours and got \$1.58 per 100 tons, and made, for the month, \$113.76, or over \$5 per day. Gaggers also work eight hours. Per 100 tons they got 90 cents, and made \$64.80, or about \$2.50 per turn. Chippers got \$2.50 for a day of 12 hours; drillers, \$2.50. These men's wages, as well as those for the chippers, are gauged by the rise and fall of the market. Rail loaders got 65 cents per 100, and their net earnings for the month were \$100. The cold sawyers got \$1.50 per day of 12 hours' work, and the water tenders \$2.70 for the same number of hours per day. Engineers' wages range from \$1.60 to \$1.80 per day, and brakemen's from \$1.25 to \$1.40.

At the furnaces the only change is that the men work longer hours and make more money. The keepers, whose earnings in 1887 rated at \$2.40 per day, last month made, on an average, \$2.90. The engineers make \$2.53 in 12 hours this year, as against \$2.90 in 12 hours last year. The fillers' wages last month averaged \$1.85 per day, as against \$1.55 per day, working on eight-hour turns, last year. Keepers' helpers, \$2.32; last year, \$1.97. The stock-yard laborers receive \$1.58 per day, against \$1.40 per eight-hour turns last year.

Recent Legal Decisions.

CONSPIRACY TO "BOYCOTT" MANUFACTURER.

P. P. Sherry made shoes, and a difficulty arose between him and a portion of his workmen. These workmen, through the president and secretary of their trade union—the Lasters' Protective Union—caused a banner to be made and to be carried in front of Sherry's factory, upon which was this inscription: "Lasters are requested to keep away from P. P. Sherry's until the present trouble is settled. Per order L. P. U." Sherry filed a bill for an injunction against the president and secretary of the union to restrain such use of the banner, on the ground that its use was part of a scheme to intimidate persons from continuing or entering his employment, which scheme was devised to injure his business. The trial court found that there was a scheme and that the use of the banner was a part of it, and the case—Sherry vs. Perkins and Leach—was reported to the Supreme Judicial Court of Massachusetts, where an injunction was granted. Judge William Allen, in the opinion, said: "The illegal scheme has been found to exist by the court below. The act of displaying banners with devices, as a means of threats and intimidation, to prevent persons from entering into or continuing in the employment of the plaintiff was injurious to him, and illegal at common law, and by the statute of this State. We think the plaintiff is not restricted to his remedy by an action at law, but is entitled to relief by injunction. The acts and the injury were continuous. The banners were used more than three months before the filing of the plaintiff's bill, and continued to be used to the time of the hearing. The injury was to the plaintiff's business, and adequate remedy could not be given by damages in a suit at law. The wrong is not, as argued by defendants'

counsel, a libel on plaintiff's business. It is not found that the inscriptions upon the banner were false, nor do they appear to have been in disparagement of the plaintiff's business. The scheme, in pursuance of which the banners were displayed and maintained, was to injure the plaintiff's business, not by defaming it to the public, but by intimidating workmen, so as to deter them from keeping or making engagements with the plaintiff. The banner was a standing menace to all who were or wished to be employed by the plaintiff, to deter them from entering his premises. Maintaining it was a continuous and unlawful act, injurious to plaintiff's business and property, and was a nuisance, such as a court of equity will grant relief against."

CONTRACT IN RESTRAINT OF TRADE.

N. owned certain land which contained deposits of sand, and he sold to S. a portion of the property, about half an acre, upon the condition that he would not sell any sand off the premises. The deed contained this covenant. S. conveyed his land to his son R. S., but his deed for it had no reference to the restrictive covenant in N's deed to him. Against the protest of N., R. S. opened a sand pit and began to sell sand, and he sued for an injunction, but his complaint was dismissed on the ground that the covenant was against public policy, and void. N. died, and his executor was substituted as plaintiff. The case, Hodge vs. Sloan, was carried to the Court of Appeals of New York, where the plaintiff prevailed. Judge Danforth, in the opinion, said: "The decision below is against our idea of natural justice, for it takes from one party an advantage which he refused to sell, and secures to the other, without price, a privilege which his grantor was unable to buy. The covenant is not against public policy, for if it is in restraint of trade, it is still valid if it imposes no restriction on one party which is not beneficial to the other, and was induced by a reasonable consideration—or, in other words, if it was a proper and useful contract, or such as could not be disregarded without injury to a fair contractor. The covenant also ran with the land and binds R. S. though it is not mentioned in his deed."

Terms Used in Electrolytic Deposition of Metals.—The terms "cathode" and "anode," says an electrical paper, are synonymous with the positive and negative poles of an electric or galvanic battery. Then to measure the volume of electricity passed between these points, the term "ampères" is used as the unit, like feet or cubic feet, for measuring in the usual mechanical sense. For expressing the force with which the volume of electricity is propelled, the term "volt" is used as the unit. The resistance opposed to the electricity is measured by "ohms." The work done in the electrical circuit is expressed by "watts" in the same way that in a steam engine the power developed is expressed by h. p. To put it briefly, thus:

$$1 \text{ ampère} \times 1 \text{ volt} = 1 \text{ watt.}$$

$$1 \text{ watt} \times 746 = \text{e. h. p.}$$

These are the electrical terms employed by common consent in all European languages in connection with this science.

In a report to his company the chief engineer of the Engine, Boiler and Employers' Liability Insurance Company, of London, England, proposes the following rule for the safe working pressure for cylindrical furnaces in flues: Safe working pressure = $\frac{50 t^2}{\sqrt{ld}}$ where t = thickness of plate in thirty-seconds of an inch, l = length of flue in feet, d = diameter in inches.

THE WEEK.

The Senate Finance Committee will begin its hearings on the alleged copper trust to-day.

The Treasury Department has refused to grant the application of Messrs. Snow & Burgess, New York, for a refund of all or part of the duties recently exacted upon the sheathing metal withdrawn in 1886 for use in construction of the ship *Corsica*, with a rebate authorized by the Tariff Act of 1883, on the ground of the applicants, that the vessel has been confessedly employed in the coasting trade for more than two months during the year ending February 6, 1888, and of the express provision contained in said law that vessels receiving the benefit thereof shall not be allowed to engage in the coastwise trade more than two months in any year, except upon the payment of the duties upon which a rebate is allowed.

A. M. Shannon & Co., of Galveston, are the lowest bidders for the construction of the Government jetty at that port. Their bid is \$402,475.

Samuel B. Hale went to Buenos Ayres in 1828 as a banker under the auspices of the Messrs. Lawrence, of Boston, and died a few days ago, leaving a fortune of \$15,000,000. He was a pioneer in the South American trade, and of late years became interested in sheep and cattle ranches.

A City of Mexico special to the Boston *Herald* says that the Mexican Central Company have signed a contract with the Government to deepen the bar at Port Tampico, making it the best on the Gulf, and aiming a heavy blow at the supremacy of the port of Vera Cruz.

The probable profits on the big Joggins raft, towed from Nova Scotia to this city, are estimated as follows: The piles are worth 5 cents per foot in New York, or say \$2 each. They cost 60 cents each at the point of shipment. An ordinary schooner will carry 500 or more in a cargo at a freight of \$1 each stick, or \$1.60 laid down in New York. The 22,000 sticks in the raft would afford cargoes to 44 vessels and a freight of \$21,000. The actual cost of the piles on the shore is \$13,000. They will realize \$44,000. That gives a profit of \$9000 if shipped by the vessels. Competent authorities say the whole cost of construction and towing will include \$10,000, thus leaving a profit of at least \$21,000.

The New York Cotton Exchange has issued its first official statement of the cotton crop of the United States. The following is a summary:

	1887-88. Bales.	1886-87. Bales.
Total port receipts.....	5,612,448	5,301,532
Net overland movement (including to Canada).....	1,001,261	820,969
Takings by Southern mills from the interior.....	433,124	377,184
Total crop.....	7,046,833	6,499,585

The crop last year was the largest ever grown in America, being 547,248 bales in excess of the previous one and 96,000 greater than the remarkable crop of 1882-83.

The Dominion fisheries is a subject exciting special interest in Canada in the prospect that important disclosures respecting their management will take place at the coming session of Parliament. The report for 1887, only now made public, shows a slight falling off in the catch of last year, as compared with 1886. The total value of the fisheries in 1887 was \$18,386,103, divided by provinces as follows: Nova Scotia, \$8,379,782; New Brunswick, \$3,559,506; British Columbia,

\$1,974,887; Quebec, \$1,773,567; Ontario, \$1,531,849; Prince Edward Island, \$1,037,425; Manitoba and Northwest Territories, \$129,084. As compared with 1886, there was a decrease of \$293,184. The total number of men employed in the fisheries was 59,933; number of vessels, 1168, aggregating 44,485 tons and valued at \$1,989,840. Altogether there is a capital of \$6,748,840 invested in the fishing industry.

The Massachusetts Institute of Technology is expected to have a membership this year of at least 300 students in the freshmen class, against 270 last year.

The Allegheny County Court House, in Pittsburgh, has been completed at a cost of \$2,268,000. Norcross Brothers, of Boston, were the contractors. There are 2500 electric lights in the building. The natural gas fire grates number 38. They are of every variety, the imitation logs and tiles being odd and unusual. In the cellar is a battery of 9 boilers to furnish additional heat and manufacture the electricity for light and call bells. The granite used in the walls and tower measures 260,651 feet; the granite ashlar 87,346 feet, the marble wainscoting 8796 feet, 5515 feet of marble carving, and 157,222 feet of foundation stone. There are over 15,000,000 brick in the structure, 28,197 square feet of plate glass, and many hundred tons of iron.

The name of Paso del Norte, the important railway center on the Mexican border, has been changed to City of Juarez. It is now emerging from the adobe period of its history.

The followers of the exiled King Maletoa, in Samoa, are in arms against German domination in that island, to the number of 3000, but resistance is futile. The island is doubtless destined to be the center of German jurisdiction in the Pacific. The exports and imports of the islands through German traders are far greater than those of all other nationalities combined, and the German tonnage also surpasses the aggregate of all other countries.

Howard Potter, of the firm of Brown Brothers, in Wall street, claims one-fourth interest in the Couch estate in Chicago, valued at \$4,000,000, and the case is before Judge Gresham.

Western New York promises a great apple crop, Niagara County alone contributing 1,000,000 barrels.

Agriculturists in the United States find that their profits, taken year after year, are narrowing down. The last annual report of the Bureau of Statistics shows the export prices of agricultural products for decennial periods as follows:

	1867.	1877.	1887.
Corn per bushel.....	\$1.00	\$0.58	\$0.47
Wheat, per bushel.....	1.27	1.16	.89
Flour, per barrel.....	8.84	6.48	4.51
Cotton, per pound.....	.30	.11	.09
Bacon and hams, per pound.....	.12	.10	.07
Lard, per pound.....	.14	.10	.07
Pork, salted, per pound.....	.13	.09	.06
Beef, salted, per pound.....	.12	.07	.05
Butter, per pound.....	.24	.20	.15

As concerns grain, low prices may be ascribed to the competition of India and South America. Lard and dairy products have suffered severely from adulteration. Both France and Germany have discriminated against American pork. Another explanation is found in the fact that cheaply run "tramp steamers" scour the globe in search of the cheapest markets. Thus, the ports of Russia, India, South America and Australia are every year brought into closer connection with the main central points of consumption, to the disadvantage of American farmers.

A resident of Turk's Island, West Indies, proposes to build a schooner to make trading voyages between the port of

Hayti, San Domingo and Turk's Island and New York. The owner intends to import goods from New York, and receive them at Turk's Island in bond, and thence forward them to such point as may seem desirable.

The brick yards at Haverstraw and other points on the Hudson River were deluged with water, suspending operations.

The exports of machinery from the port of New York during August were valued at \$327,876.

Complaints are frequently made to the Treasury Department of alleged erroneous reappraisements of imported merchandise said to be due to the selection as merchant appraisers of persons who are not familiar with the value and character of the merchandise appraised. In order to obviate further complaint on this score the Department has amended the customs regulations so as to require the merchant selected for that service to make oath that he is familiar with the character and value of the merchandise to be appraised.

Yellow fever causes much consternation in some parts of the South. At Jacksonville there is no improvement. At Memphis only mail cars are permitted to enter from the infected cities. Decatur, Ala., is almost depopulated. At Montgomery troops are enforcing the quarantine. New York responds liberally to the call from Jacksonville by subscribing some \$80,000, besides forwarding large quantities of provisions and general supplies.

A training ship for Philadelphia has been secured for Philadelphia through the influence of prominent business men in that city, and the Government ship *Jamestown* will be fitted up for instruction in practical navigation. The City Council will be asked to appropriate \$11,000 for its maintenance.

In real estate and banking circles in this city a profound sensation was caused by the discovery that Bedell, a long trusted clerk in the law office of Barlow, Laroque & Shipman, had obtained \$264,000 on bogus mortgages. The amount is thus apportioned: Farmers' Loan and Trust Company, \$109,500; Herman Koob & Co., \$17,000; Robert Center, \$43,000; J. Egmont Schermerhorn, \$58,500; E. Sloan, \$30,500, and some other clients of the firm, \$6500. These parties expect that the lawyers will make their losses good; the lawyers, in turn, will seek reimbursement from the Broadway Bank, on the around that the bank is responsible for money paid on forged indorsements. The bank, in turn, may look to Bedell and the notary, Henry, who is implicated in the various transactions.

On the 17th inst. Charles A. Pillsbury & Co., of Minneapolis, Minn., the largest flour-milling firm in the world, divided \$40,000 among their employees, in pursuance of a profit-sharing system adopted four years ago. For two years there were no profits to divide, but the past year witnessed a change, large returns were received and the firm have thus been enabled to show their good faith. Few concerns have ever distributed among their employees a larger gross annual amount as their share of profits.

West Superior, in Wisconsin, is among those cities in the Northwest which aspire to control the course of trade in that direction. She thinks she has gained a point through the construction of the Eastern Railway of Minnesota now nearing completion. The editor of the *Inter-Ocean* says: "That territory in the Northwest, which must eventually divide its business at least between the cities at the head of Lake Superior and the city at the heel of Lake Michigan, is as large in

area as ten Englands, and capable of maintaining without poverty 100,000,000 people. It will, on a moderate estimate, within the next cycle of ten years, contain 6,000,000 of people, capable of supporting with the produce of its own soil the Twin Cities with 500,000 inhabitants, and Twin Cities at the head of Lake Superior with a population of 250,000. Our development will be somewhat retarded at the start by the enormous powers of absorption of St. Paul and Minneapolis. But eventually our growth will astonish and in a large measure supersede theirs."

The sudden collapse of paper money in Peru forms the subject of an interesting communication from Consul Brent. The calamitous termination of the war with Chili so far impaired confidence in the ability of the government to redeem its notes that the purchasing power of paper money dropped to about one-twentieth of that of silver. Nevertheless, up to within a year the absence of other circulating mediums caused the paper to be retained in use, although the fall in its exchangeable value had brought ruin to numbers of people whose means were represented by it. At the present time, however, paper money is virtually repudiated in all business transactions not directly connected with the government. It is of value only in paying duties to the extent of ten per cent. It is estimated that there were 60,000,000 paper sols in circulation or in private hands. This sum was equivalent to 2,000,000 silver sols, and in the course of week was practically lost. Such a blow to a nation in such financial straits as Peru is hardly conceivable abroad. Numbers of families in Callao and Lima for a time were unable to buy the necessities of life.

The recent report that the Rhode Island coal mines have been purchased by the Worcester Iron Works, of Worcester, Mass., has been confirmed. It is stated that the mines are to be opened once more, new and improved machinery is to be employed in mining, and the purchasers are sanguine that in their hands the enterprise can be made profitable.

D. W. C. Carroll, of Pittsburgh, and Morris and Karttrel, of Chicago, have closed contracts for the building of two iron viaducts for the city of Denver, Col., to cross the railroads in that city. One viaduct is to be 376 feet long and 32 feet high, and the other 785 feet long and 32 feet high. The viaducts are to be made of structural iron, including the approaches. The viaducts cost \$97,000 and the approaches \$21,000 additional.

The New Orleans *Times-Democrat* says: "The following is the assessment of several Southern States during the census year and for 1887-88. The assessment now being made will show a still larger increase:

	1887-88	1879-80
Alabama.....	\$214,925,869	\$117,486,181
Arkansas.....	148,868,206	86,409,364
Florida.....	84,860,584	29,471,618
Georgia.....	841,504,921	235,650,530
Kentucky.....	488,491,690	318,087,875
Louisiana.....	221,500,000	158,587,495
Mississippi.....	120,887,254	106,594,708
North Carolina.....	210,035,453	156,100,202
South Carolina.....	141,495,056	132,027,986
Tennessee.....	239,750,000	211,768,538
Texas.....	650,412,401	304,493,163
Virginia.....	374,043,388	308,455,135
Total....	\$3,240,774,722	\$2,164,792,795

Nearly 11,000 tons of henequin have been imported into the United States from Mexico within the last three months.

It is reported that a syndicate has been formed by Governor Gordon, Henry W. Grady, and others, of Atlanta, Ga., and John H. Inman, Calvin Brice, General Samuel Thomas, Dr. Norvin Green, and others of this State, for the purpose of building a city at Rockmart, Ga., and developing the slate and marble quarries

there. The slate quarries on which the syndicate have an option are valued at \$10,000,000. The property cost the syndicate \$400,000 in cash and \$4,000,000 in stock.

The Lehigh Valley Transportation Company, of Buffalo, have just contracted for two propellers to be built by the Globe Iron Works, Cleveland, which are to be finished by the opening of navigation next season. Each vessel will be 308 feet over all, 290 feet keel, 40 feet beam and 25½ feet hold. Each will carry four masts and the engines and boilers will be near the middle of the ship.

The port of Beyrout, the financial center of Syria, midway between Smyrna and Port Said, is to be made a harbor of refuge for vessels navigating that part of the Mediterranean under an imperial concession, and the work is to be pushed rapidly to completion. Jetties are to be built which will form an inner harbor of 56 acres, with wharves, storehouses, tramways, &c. The work will cost \$1,200,000 and it must be completed within five years.

The steamers plying between New York and Vera Cruz via Havana will shorten their time to 8½ days between the two ports, making the round trip one week less than heretofore, greatly to the advantage of traders.

The Cunard steamer *Etruria* once more beats the record, having arrived at this port from Liverpool on Saturday, after a passage of 6 days 1 hour and 50 minutes—the best time ever made by a transatlantic vessel. The *Etruria* had previously held a record of the quickest ocean voyage—6 days 1 hour and 55 minutes. The vessel left Queenstown on Sunday, September 16, at 1.15 p. m. On the first day she made 437 knots; on the second day, with fair weather and a moderate breeze, she covered 465 knots; on the third day, despite a westerly swell, 456 knots were passed, and with moderate winds and fine weather on the fourth day 490 knots were left behind. On the fifth day, despite two hours of fog in the morning, she again covered 490 knots, and on the sixth day, with everything favorable, only 455 knots were placed to her credit. The vessel's average daily run was 460 knots, and per hour she averaged 19.2 knots.

A rapid transit scheme for cattle in palace cars from the Western plains to the seaboard has been inaugurated by a New York company, who promise to deliver stock in the market in less than 120 hours from the Idaho ranges, 2500 miles distant. The animals are fed and watered *en route*.

Traffic between Vera Cruz and the Mexican capital is suspended for at least a fortnight, on account of the destruction by floods.

How Norwegians are able to compete successfully in the trade with the United States and even find profitable employment in the maritime provinces of the Dominion is easily explained. The first cost of a Norwegian vessel is about one-half of the cost of an American vessel, and the crews employed receive about \$10 a month. Naturally not a few Norwegian seamen seek to better their condition on this side of the Atlantic.

Trials of Rapid Firing Guns.—A report has just been made to the British War Office upon the experiments recently carried out with the Maxim gun at 600 and 800 yards, in comparison with fire from Martini-Henry rifles. At 600 yards 15 men, all first or second class shots, fired ten volleys and made 52 per cent. of hits in 3 minutes 36 seconds, while the Maxim, firing the same number of rounds at the same targets, made 81.56 per cent. of hits in 2 minutes 36 seconds. At 800 yards the results were: 15 Mar-

tini-Henrys, 40.66 per cent. of hits in 3 minutes 40 seconds; Maxim, 80 per cent in 1 minute 30 seconds. The targets were arranged so that the volleys fired by the men were directed alternately a quarter right and a quarter left, the intervals between the targets being 12 yards; the Maxim fired 15 shots alternately on each target. Further experiments are to be made at unknown distances, and as nearly as possible under service conditions, at ranges between 1000 and 1200 yards; and on this occasion the new service rifle, with dial sight, is to be tested.

Recent Treasury Decisions.

The Secretary of the Treasury has issued the following decisions under the customs laws affecting metals:

DUTY ON "REMELTING STEEL."

On an appeal from assessment of duty at the rate of 45 per cent. ad valorem on certain so-called "remelting steel" claimed to be dutiable at 20 per cent. ad valorem, as unwrought metal, or at ⅓ cent per pound by similitude to pig iron, spiegeleisen, wrought and cast scrap iron and scrap steel, or at not more than 35 per cent. ad valorem, under the provision for iron in slabs, blooms, loops, &c. The Department says: "From the special report of the appraiser, it appears that the merchandise in question consists of the best quality of Bessemer steel slabs or cakes, intended for use in the manufacture of finished steel plates, sheets, or bars, and that it was returned and assessed with duty as steel in slabs, under the provision for 'steel ingots, * * * and slabs, by whatever process made, * * * valued at 4 cents a pound or less.' The assessment of 45 per cent. is affirmed."

COVERED DRESS STEELS.

The appellants claim that the merchandise in question is dutiable either at 3½ cents per pound, as steel strips valued over 10 cents per pound, or at 35 per cent. ad valorem. As the merchandise is admittedly an article composed in part of steel, the Department is of opinion that it was properly classified, imposing duty at the rate of 45 per cent. as manufactures of steel and cotton.

DUTY ON LARDING NEEDLES.

Under a claim of appellants on larding needles dutiable at 20 per cent. ad valorem the Department says: "It appears, from the special report of the appraiser, that the articles in question are in no sense needles, but consist of what are commercially known as 'larding pins,' the same being conical in shape, made wholly of metal, and varying in length from 6¼ inches to 9¼ inches, each having one of its ends very finely pointed and sharpened and its other end broad and hollow, for the purpose of receiving strips of lard, which, by use of these pins, are passed into and deposited in meats preparatory to cooking, the process being termed 'larding.' In the opinion of the Department these articles, which are used for culinary purposes only, and which are not either commercially or otherwise known as 'needles,' are liable to the rate of duty 45 per cent. ad valorem assessed under the provision for 'manufactures, articles or wares, * * * composed wholly or in part of iron.'"

CHAIN LINKS.

1. Certain links with movable bolts, for the adjustment (by shortening or lengthening) of chains, and which are first forged and then finished by boring, &c., and subsequently japanned or galvanized, are not forgings of iron within the meaning of the tariff, but are dutiable as manufactures of iron not otherwise provided for, under T. I., 216. (Letter to Collector of Customs at New York, September 3, 1888.)

MANUFACTURING.

Iron and Steel.

Operations have been resumed in the socket department of the works of the Pittsburgh Tube Company, at Pittsburgh. As soon as enough stock is secured the balance of the works will resume operations.

Last week there was shipped from the works of the National Tube Works Company, at McKeesport, Pa., the last of a large order for the City Water Works, at Carson City, Nev. The contract required the use of 28 cars to transport the pipe. Most of it was 24 inches in diameter.

The new sheet mill just added to the extensive plant of the Standard Iron Company, at Bridgeport, Ohio, was successfully put into operation on Monday, the 17th inst. The three-high plate mill now in course of construction will be completed and ready for operation about October 1 next. The mills were built by the Lewis Foundry and Machine Company, Limited, of Pittsburgh, Pa.

M. V. Smith, metallurgical engineer, of Pittsburgh, has just been appointed consulting engineer for the Minnesota Car Company, of Duluth, Minn., with headquarters in Pittsburgh. This new company is composed principally of capitalists from Richmond, Va., the president being John Anderson, of the Tredegar Company. The capital is \$400,000, all of which has been paid in. The plant will consist of a rolling mill with two trains of rolls, one 10-inch and one 18-inch, machine shops, foundry and car works having a capacity of 30 cars per day. Ground has already been secured, and work on the new buildings will be commenced at an early date. The bulk of the machinery will be supplied by Pittsburgh manufacturers.

The Carrie Furnace Company, of Pittsburgh, have decided to erect another blast furnace at Rankin Station, on the Baltimore and Ohio Railroad, adjacent to their present furnace located at that place. It will be 18 x 80 feet, and will have a capacity of about 200 tons per day. The contract for the erection of the furnace will probably be let the present week, and work will be commenced as soon after as possible.

Charles Huston & Sons, proprietors of the Lukens Rolling Mills, at Coatesville, Pa., have commenced the erection of a building for library purposes in the interest of their workmen and their families. Besides the library apartment it will have two classrooms, in which instruction in sewing will be given to the daughters of the workmen. A small library has been open to the men for some time, and this is now to be enlarged and benefits extended to the families.

The manufacturing industries of the Shenango Valley, Pa., are reported to be in better condition at the present time than for some years past. The following brief statement received from Wheatland, Pa., under date of the 19th inst., gives the condition of the various enterprises on that date, as follows: "Greenville mill in all departments is on double; Sharpsville, with one or two exceptions, all her blast furnaces in full blast; Sharon, P. L. Kimberly & Co.'s mills and furnaces pushed with orders; also the Sharon Iron Works working full with large orders ahead; Stewart Iron Company mill with 13 furnaces making a fine quality of steel and rolled billets, one blast furnace on, the other repairing; foundries all working full; Wheatland still idle, but with bright prospects for a glorious future. At West Middlesex one furnace making an excellent quality of Bessemer iron and the other to be put in operation as soon as possible.

The manufacturers say that they have orders enough to keep the mills running full until next fall."

The Helmbacher Forge and Rolling Mills Company have not as yet reorganized since the old board of directors was re-elected at the stockholders' meeting—at any rate they had not up to last Monday. The works were idle during the early part of the week to admit of repairs to engines, &c., and were to restart as soon as these were completed.—*Age of Steel, St. Louis.*

Work on the new blast furnace of the Gadsden Furnace Company, at Gadsden, Ala., is progressing rapidly, and it is expected to be ready for blast by October 1 next. It will have a capacity of 100 tons per day.

The nail factory of the Laughlin Nail Company, at Wheeling, W. Va., continues in constant operation, the company finding a ready market for their product as fast as produced. Their factory is next to the largest in the world, containing 220 nail machines.

In our issue of last week we made mention of the fact that the Wayne Iron and Steel Works, of Brown & Co., at Pittsburgh, were closed down in all departments on account of a labor dispute. The trouble has since been amicably arranged and the plant is again in operation in all departments.

The Lloyd-Booth Company, proprietors of the Falcon Foundry and Machine Works, at Youngstown, Ohio, have purchased the machinery that has already been erected in the partially completed rolling mill at Bowling Green, Ohio, and will remove it to Youngstown and scrap it. The mill was to have been built by parties from Youngstown and others interested in the rolling mill at Portsmouth, part of which was to be used at Bowling Green. The citizens of Bowling Green offered a bonus if the mill was ready to turn out iron at a certain time. Part of the buildings were erected, when a storm blew the structure down. This discouraged the owners, and as they would not rebuild in time to claim the bonus the project fell through. The plant was sold at sheriff's sale.

The steel department of the plant of the Pottsville Iron and Steel Company, at Pottsville, Pa., which has been idle for about two months, has resumed operations, giving employment to about 90 men. All departments of these works, consisting of rolling mill, puddling mill and steel department, are being operated to their utmost capacity.

Clinton Furnace at Pittsburgh, formerly owned by Graff, Bennett & Co., and which has been idle since the suspension of that firm in the early part of the year, was blown in again on Monday the 17th inst. The syndicate of creditors which purchased the plant of the firm will operate it as soon as a sufficient supply of pig iron is obtained. The Clinton Rolling Mill, situated in close proximity to the furnace, will also be started up. The resumption of operations by this furnace leaves but three idle blast furnaces in Allegheny County at the present time, all of which are undergoing repairs. There are the Edith of the Edith Furnace Company, Lucy No. 2 of Carnegie Brothers & Co., Limited, and Soho of the Moorhead-McCleane Company.

One of the Musconetcong furnaces at Stanhope, N. J., went into blast on the 17th inst.

On Monday, the 17th inst., the heaviest casting ever made by the Pittsburgh Steel Casting Company was successfully run at the works of that company in Pittsburgh. This was the pouring of the stem post of the warship Maine, now in course of construction at the Brooklyn Navy Yard. It is an L-shaped affair, the two arms measuring respectively 26 and 13 feet, portions of the casting being 42 inches thick. This heaviest portion is to act as a ram when upon the bow of the Maine. To fill the mold, 11 tons of steel were required, and the finished casting will weigh about 18,000 pounds. The length of the longest arm of the casting is 26 feet, that of the shortest is 13 feet 10 inches. It is 18 inches in width, and varies from a little over an inch to 42 inches in thickness. It must stand a Government test of 60,000 pounds tensile strength to the square inch, and an elongation of 10 per cent. in 8 inches. A piece of the cold metal an inch square must be bent at an angle of 90 degrees without fracture. The casting will be removed from the mold the present week, and will then be placed in an annealing furnace. A Government test will be made shortly afterward, and if it proves satisfactory it will then be delivered to the Government. The stern post and rudder for the Maine will also be cast by this firm in the course of a few weeks. The former will weigh but little less than the stem post, while the rudder will weigh about 14,000 pounds.

Machinery.

The Wheelock Engine Company, of Worcester, Mass., have been compelled to operate their works night and day to keep pace with their orders. Among their recent shipments are a 200 horse-power engine to the Linseed Oil Works, Sioux City, Iowa, and one of the same size to the Gleason Knitting and Mfg. Company, Seneca Falls, N. Y., and 150 horse-power engine to the B. Shoninger Company, New Haven, Conn. They are engaged on a large amount of repair work, including a good order for the Agawam Paper Company, Miltineague, Mass.

The plant of the New Process Twist Drill Company, at Taunton, Mass., has been bought by P. H. Corr and others, who will assume all liabilities and form a new company. The price paid was \$5000. It is stated that the new company will at once proceed to put the works in operation again.

The Ranken & Fritsch Foundry and Machine Company have filed articles of incorporation in the recorder's office, at St. Louis, with a capital of \$150,000. The new company are composed principally of the old stockholders of the Smith, Beggs & Ranken Machine Company, whose failure was noted some months ago.

The Standard Underground Cable Company, of Pittsburgh, have closed two large contracts for electric-light cables for Chicago. One contract was made with Prof. J. P. Barrett, superintendent of the Electrical Department of Chicago, for 5 miles of electric light cable, which will connect with the municipal light station of that city and distribute the current to 65 arc lamps, each having a lighting capacity of 2000 candle-power. The other contract is to furnish 50,000 feet of cable for the Consumers' Electric Cable Company, of the West Side, Chicago. The incandescent electric light will be used in the latter place, and the Westinghouse Electric Company have secured the contract for furnishing the lamps.

The Phoenix Iron Works, of Meadville, Pa., under date of the 17th inst., writes us as follows: "We are building an addition to our machine shop building 100 x 40 feet, in which will be located our blacksmith shop and erecting shop, all of the present building, including space now occupied by blacksmith shop and office, will be thrown into the machine shop proper. We have been obliged to get more room and put in additional machinery to keep up with our orders for our new

automatic cut-off engine. We expect also to increase our boiler shop facilities in the near future, as we are now crowded beyond our present facilities. We are also building a new office and drafting-room, said building will be 25 x 50. All the above will be substantial brick buildings."

The Wilson Mfg. Company was recently incorporated at Chicago, with a capital of \$300,000, for the purpose of manufacturing automatic regulating valves, faucets, &c. The incorporators are E. F. Brown, Jr., Robert W. Clarke and F. C. Rutan. Also, the Oregon Foundry Company, Oregon, Ill., with a capital of \$3000, by Frederick G. Jones, Benjamin F. Sheets and R. A. Austin.

The Hughes Steam Pump Co., of Cleveland, Ohio, have just completed the boilers and pumping machinery for the Salisbury Water Company, of Salisbury, Md. The pumping engine is of the compound duplex non-condensing type and has a capacity of 500,000 gallons per diem.

The Jeffrey Mfg. Company, of Columbus, Ohio, have made shipments of their Coal Mining Machinery and Power Coal Drills, recently, as follows: Reinecke Coal Co., Madisonville, Ky., One Power Drill; Cherokee & Pittsburgh Coal Mining Co., Pittsburgh, Kansas, Two Mining machines and One Power Drill; Canon City Coal Co., Brookside, Col., One Power Drill; Coal Bluff Mining Co., Clay City, Ind., One Mining Machine; Union Pacific Coal Co., Rock Springs, Wyo., Four Mining Machines. (These are in addition to the eight now in use at their mine, No. 4.) Sunnyside Coal Co., Evansville, Ind., Three Coal Drills; San Pedro Coal and Coke Co., Carthage, New Mexico, Two Power Drills; Sand Coulee Coal Co., Great Falls, Montana, Two Mining Machines; Spring Valley Coal Co., Spring Valley, Ill., Two Mining Machines.

The Hill Clutch Works of Cleveland, Ohio, report recent sales to E. P. Allis & Co., Brush Electric Company, Niles Tool Works, Walker Mfg. Company, Wm. Tod & Co., Geo. V. Cresson, Lane & Bodley and Fraser & Chalmers. They have also in hand complete power plants for the Oakland Electric Light Company, Cal.; Huntington Electric Light Company, W. Va.; St. Paul Gas Company, Electric Light Company, Helena, Mon. These companies report that they are working to the utmost limit of their capacity night and day, and are constantly enlarging their facilities to keep pace with their increasing trade.

Among the new factories being put up in the South is one under construction known as the Eufaula Cotton Mills, at Eufaula, Ala. It is to contain about 8000 spindles and 240 looms. The machinery is being constructed by the Lowell Machine Shop, of Lowell, Mass., and the belting will be supplied by the Page Belting Company of Concord, N. H.

The Washburn & Moen Mfg. Company shipped recently to the North Hudson County Railway Company at Hoboken, N. J., 13,000 feet of 1½-inch steel rope on one reel. The rope weighed 50,144 pounds.

Hardware.

Besides the introduction of Crude Oil as a fuel in their works, the St. Louis Shovel Company, St. Louis, Mo., have put in additional machinery which will give them an increased product, making their daily output 200 dozen Shovels, Spades and Scoops.

The Syracuse Forging and Gun Company, Syracuse, N. Y., whose works were partially destroyed June 2 by fire, have restored the works and are again in active operation, having had a delay in the progress of the business of about two

months. The wheel plant of this company, which sustained severe damage by the fire mentioned, is again in running order, and the company are now prepared to receive orders and to supply the large demand which they had established before the fire.

Jewett & Hatheway, Bridgeport, Conn., have begun the manufacture of sheet metal goods, patented novelties, light hardware, wood and metal patterns, dies, &c., corner of South avenue and Water street.

The Perkins Specialty Lock, Cleveland, Ohio, referring to the fact that the increasing demand for their goods has necessitated the extension of their manufacturing facilities, state that their company will hereafter be known as the Perkins Lock Mfg. Company, and allude to their increased capital and enlarged manufacturing facilities.

The Hollenbeck Lock and Knob Company, until June last in Syracuse, have completed new works in Jordan, N. Y., to which they have removed, and where they will continue the manufacture of hardware specialties. The new plant embraces a four-story structure, 70 x 50 feet, and adjoining foundry, 40 x 70 feet, with an annex for jappanning purposes, 30 x 20 feet. The first floor includes the offices, sample and shipping department, as well as machine and iron rooms. The second floor is occupied as a brass foundry, and assembling stock and pattern shops; the third floor being used for wood-working and varnishing, and the basement for polishing, coloring and lacquering. These works are located on the stream known as the outlet of Skanateles Lake, which furnishes a never-failing supply of power.

Henry Seymour Cutlery Company, Holyoke, Mass., have recently erected an addition to their factory, 120 x 30 feet, to accommodate their increasing business. They report that sales for eight months of the year 1888 show an increase of 10 per cent. over corresponding time last year, with an increase also in export trade. They refer to the ruling of the Secretary of the Treasury, placing sheep shears under manufactures of cutlery and 35 per cent. duty, instead of keeping them as they have been heretofore as manufactures of steel at a duty of 45 per cent., as affecting the sale of the goods largely the past season.

Miscellaneous.

A certificate of incorporation has been issued to the Rush Run Coal and Coke Company. The principal office is to be at Staunton, Va. The sum of \$20,000 has been subscribed to the capital stock, \$2000 of which have been paid in. The privilege of increasing the stock to \$500,000 is reserved. Shares are \$100 each and are held by F. Harrold, Fayette county; J. F. Effinger, W. P. Tames, A. S. Lara, Staunton, Va.; E. C. Best, Ronceverte, West Va., and C. M. Liggett, Lexington, Va.

A charter has been granted to the Pittsburgh Reduction Company, of Pittsburgh, with a capital stock of \$20,000. It is formed for the purpose of reducing bronzes and commercial alloys and manufacturing the same. The shareholders are: Alfred Hunt, H. W. Lash, Robert Scott and Millard Hunsicker, of Pittsburgh; George H. Clapp, of Edgeworth, and W. S. Sample, of Sewickley.

The new coaches in use on the New York and New England's Boston trains from this city are as handsome and comfortable cars as any run out of Providence. They are mounted on the Brunswick spoke wheels, have double windows, which keep out cold and dust, and Pullman curtains. The ceiling finish is in wood, and five double burners in each car

give plenty of illumination. The Hale & Kilburn shifting seat, with cherry frame, is used, upholstered in the ordinary coaches with plush, and in the smokers with rattan. Floors, sides and roof are filled with mineral wool which deadens the noise. The road has recently put on fifteen of these new cars.

The Rhode Island Locomotive Works have recently delivered nine ten-wheeled engines to the Chicago, Milwaukee and St. Paul Railway, two more were sent to-day, and four more remain before the order is filled. These are of the same style as others built for the St. Paul. This one railway alone have in use more than 200 locomotives from the Rhode Island Works.

Among recently authorized corporations in Illinois are the following: The Darby Lead Mining and Smelting Company, of East St. Louis; capital, \$500,000; incorporators, John C. Nial, George Frey, C. M. Sharpe and Walter H. Darby. The Peoria Cordage Company, at Peoria; capital \$200,000; incorporators, Martin Kingman, E. C. Heidrich, Charles A. Jamison and G. H. Schimpff. The Merchants' Arc Light and Power Company, of Chicago; capital, \$30,000; incorporators, William H. Collins, Joel W. Stevens and Benjamin Keigher. The Wills Horseshoe Company, of Chicago; capital, \$12,000; incorporators John H. Purdy, Harry A. Wills and Edward Williams. The American Gear Forging Company, of East St. Louis; capital, \$100,000; incorporators, O. Navins, Arthur W. Billings and William S. Long. The Clinton Electric Light, Heat and Power Company, of Clinton; capital, \$25,000; incorporators, Vespasian Warner, Clifton H. Moore, John Warner, Abner R. Phares, and Richard Butler. The Anchor Iron Car Roofing Company, of East St. Louis; capital, \$50,000; incorporators, H. D. Sexton, Henry O'Hara, and Royal J. Westney. The Galena Electric Light Company, of Galena; capital, \$10,000; incorporators, John A. Mensell, August Reid, and Benjamin Franklin Mensell.

Aerial Photography.—M. Arthur Batut, of Enlaure, Tarn, writes to *La Nature* that he has succeeded in taking aerial photographs by means of a kite. He finds that a kite 6 feet 6 inches high by 4 feet 7 inches wide will easily carry a photographic apparatus weighing 2.2 pounds. Our contemporary states that two photos taken by M. Batut at altitudes of about 250 and 330 feet respectively, although faint, give a plan of the house and farm at Enlaure, and may be looked upon as very successful first attempts.

It is rumored that the Argentine Government contemplates placing with our manufacturers contracts for 50 locomotives of various classes, and has already entered into agreements for the purchase of rails and coaches.

Paper pasted, gummed, or glued on to metal, especially if it has a bright surface, usually comes off on the slightest provocation, leaving the adhesive material on the back of the paper, with a surface bright and slippery as ice. The cheaper description of clock dials are printed on paper and then stuck on zinc, but for years the difficulty was to get the paper and metal to adhere. It is, however, said to be now overcome by dipping the metal into a strong and hot solution of washing soda, afterward scrubbing perfectly dry with a clean rag. Onion juice is then applied to the surface of the metal, and the label pasted and fixed in the ordinary way. It is said to be almost impossible to separate paper and metal thus joined. Probably metal show tablets might be successfully treated in the same manner.

TRADE REPORT.

Chicago.

Office of *The Iron Age*, 95 and 97 Washington St.,
CHICAGO, September 24, 1888.

Pig Iron.—The volume of business continues to shrink, most dealers reporting a very quiet week. A few of them are enjoying a steady demand for lots of 50 to 100 tons from small consumers, and one sale of a round lot of Lake Superior Charcoal Pig was made at \$21, four months. A demand for Charcoal, for Car-Wheel purposes, is among the possibilities of the near future, as Car-Wheel manufacturers are sounding the market in anticipation of orders for cars which are expected to be placed very shortly. Their inquiries run largely to high numbers, showing that Old Car-Wheels are scarce, and that consequently a greater proportion of Pig will be needed than usual. It is rumored that some of the Coke furnaces are soliciting business with more vigor than has been the case for several weeks, but this is alleged to be a canard put forth by buyers who hesitate to pay the advanced prices now ruling, and hope to work back to something like the old rates. Furnace companies using Lake Superior Ores state that higher prices for Pig are more likely to be realized than lower figures, because Ore is dearer and Coke seems strongly inclined to mount upward also. Agents for Southern Coke furnaces have been doing very little here of late, the high prices now asked interfering with new business. They fear that deliveries on old contracts which are now being made will be checked by the advance of yellow fever toward the Alabama Iron districts. Cash quotations, f.o.b. Chicago, are as follows: Lake Superior Charcoal all numbers, \$19.50 @ \$20.50; Alabama Car-Wheel, \$26.25; Jackson County Softeners, No. 1, \$18 @ \$18.50; Hocking Valley Soft Foundry, No. 1, \$17.50 @ \$18; American Scotch (Blackband) No. 1, \$19 @ \$20; other Ohio Scotch Irons, No. 1, \$18 @ \$19; Lake Superior Coke, No. 1, \$17.50 @ \$19; No. 2, \$16.50 @ \$17; No. 3, \$15.50 @ \$16; Southern Coke, No. 2, \$17.75 @ \$18; No. 2½ and Open Bright, \$17.25 @ \$17.50; No. 3, \$16.75; No. 1, Mill, \$16.50.

Bar and Structural Iron.—A very light demand is experienced for Bar Iron, but considerable business is expected shortly from car builders, who report increased inquiry from railroad companies. The mills are generally well filled with orders and little anxiety is manifested by their agents for new business. The usual quotation for mill lots of Common Iron is now 1.80¢, half extras, f.o.b. Chicago, and it would take very favorable specifications to shade this to any extent. For small lots from store jobbers are endeavoring to get 2¢, with 1.90¢ named as bottom to best buyers. Mill lots of Structural Iron are quoted as follows, f.o.b. Chicago: Angles, 2.25¢; Universal Plates, 2.25¢ @ 2.30¢; Tees, 2.50¢ @ 2.55¢; Beams and Channels, 3.40¢. Store prices of Angles are 2.40¢ @ 2.50¢; Tees, 2.60¢ @ 2.70¢; Beams, 3.80¢.

Plates, Tubes, &c.—Business continues fair but little change occurring in volume or character. Heavy Sheets are firmer, and higher prices are asked in some cases, but Plates are without change. Tubes are hardly being maintained at the discount recently agreed upon. Quotations from store are as follows: Heavy Sheets Nos. 10 to 14, 2.6¢ @ 2.70¢; Tank Iron, 2.55¢; Tank Steel, 2.80¢; Shell Iron, 3¢; Shell Steel, 3.25¢; Flange Iron and Steel, 4¢; Fire-Box Steel, 4.75¢ @ 5.75¢; Boiler Rivets, 4¢ @ 4.25¢; Ulster Iron, 3.75¢; Boiler Tubes, 62½ ¢ off.

Sheet Iron.—A few inquiries are noted for mill lots, but it is very difficult to find a manufacturer able to make any deliveries this year. It is claimed that a market could be found here for a great deal more Sheet Iron if a supply was available. Manufacturers' agents state that the consumption for Roofing has grown enormously of late, and they believe that hereafter the Sheet-Iron trade will be more evenly distributed through the year. Some mills are quoting 3¢ @ 3.10¢, f.o.b. mill, for No. 27 for such deliveries as they can make, the higher rate being for earliest shipments. For December 3.10¢, Chicago, is named by a few mills to their regular customers. Jobbers' prices from store are 3.20¢ for No. 24, 3.30¢ for Nos. 25 and 26 and 3.40¢ for No. 27.

Galvanized Iron.—The activity in this branch is more pronounced than ever the past week, showing a decided gain in the volume of business transacted by manufacturers' agents. The demand covers all classes of consumers, but runs more particularly to high-grade material. Prices are firmer, and on some standard brands an advance of 5 ¢ has been made. Jobbers still quote small lots at 60 ¢ off for Juniata, and 60 ¢ and 5 ¢ off for Charcoal.

Merchant Steel.—The demand is irregular, some houses reporting a good business, while others have suffered a period of dullness. Combination prices from store are continued, as follows: Bessemer Bars, 2.30¢ @ 2.40¢; Tool Steel, 8½¢ @ 9½¢; Specials, 13¢ @ 25¢; Crucible Spring, 4.40¢; Open-Hearth Spring, 2.90¢; Open-Hearth Machinery, 2.75¢ @ 3¢; Crucible Sheet Steel, 7¢ @ 10¢. Some of these prices are being shaded by works not in the combination.

Steel Rails.—Nothing has happened during the week to enliven business. A few railroad companies are talking of placing orders for 5000 to 10,000 tons, and some even ask quotations for next year's delivery, but they are slow to come to terms. The North Chicago Rolling Mill Company have resumed operations, but the Union Steel Company will shut down in a few days for lack of work. The Joliet Steel Company started up later than the others last spring, and will run longer before they clean up their order book. Quotations are nominally \$30 @ \$31.

Old Rails and Wheels.—Very few transactions in Old Iron Rails have come to light. One sale is reported at \$24, and another \$23.50. The exact condition of the Old Rail market is difficult to ascertain, but the impression is quite general that for the present, at least, the upward movement has culminated, though some of those interested are still talking higher prices. The supply has now overtaken the demand, and unless other markets advance it seems reasonable to expect a decline here to some extent. Short ends of Old Steel Rails have been sold at \$16.50, but long lengths are worth \$19 @ \$20. Old Car-wheels are very quiet, with \$19 @ \$19.50 nominal quotations.

Scrap.—Increasing inquiry for Wrought has run up the price, but this again has checked business, as consumers are indisposed to pay the advance asked by dealers. Steel Scrap is looking up a little, but Cast is still quiet. Quotations for carefully selected are as follows, per ton of 2000 lb.: No. 1 Forge or Railroad Shop, \$20.50 @ \$21; Track, \$20; No. 1 Mill, \$16; Tank and Pipe, \$13; Sheet, \$9.50; Horseshoes, \$20; Axles, \$26; Cast Machinery, \$15; Stove Plate, \$12; Cast Borings, \$9.50; Wrought Turnings, \$12.50; Axle Turnings, \$14.50; Coil and Leaf Steel, \$16 @ \$17; Locomotive Tires, \$17. Dealers offer \$14 for Mixed Country Scrap.

Hardware.—Continued improvement is reported in Heavy Hardware, but reports vary as before with regard to Shelf Hard-

ware, some houses stating that business is even dull, while others are having a most excellent trade. With Western agriculture in its present prosperous condition the general demand for Hardware ought to improve very soon, unless the influence of last year's failure of the crops is so far-reaching as to yet seriously affect the farming interest. Manufacturing consumers of Heavy Hardware are purchasing more freely. Wagon-makers' prospects are particularly bright, and wagon material is correspondingly active and firm. Nuts and Bolts are firmer in sympathy with dearer Iron. The market is bare of Stove Boards, and the jobbers are pushing the manufacturers vigorously for more rapid deliveries, meanwhile borrowing from one another. Prices are now firm at 50 ¢ and 10 ¢ off for Crystallized from store, and other kinds in proportion. In consequence of the advance in manufacturer's price of Zinc, full casks are now held at 6½¢, and smaller quantities at 6¼¢ @ 7¢. Shot has been marked up to \$1.45 per bag, and strictly half-and-half Solder to 18¢ per lb., in consequence of the higher price of Lead and Tin.

Nails.—Little is being done in large quantities, or even in carloads, but jobbers are having a good demand for sort-up lots. Nearly every order for Hardware now has Nails in it. Small lots are quoted from store at \$2.10 for Steel and \$2.05 for Wire, but these prices are being shaded to some extent. The project for the formation of a pool among the manufacturers of Cut Nails is reported to be progressing very favorably, and the signatures of but few more manufacturers are needed to make it operative. If they are not secured by the 1st of October every effort is to be made to have them by the 1st of November. Much importance is being attached to this scheme on account of the high character of the men who are promoting it, and the commanding influence of the works which they control. It is very certain that if the organization is perfected prices of Cut Nails will be marked up.

Barb Wire.—No change has occurred to brighten the prospect. Orders are small and prices are unremunerative. The nominal quotations are 3¢ for Painted and 3.75¢ for Galvanized, but concessions are made even for small lots.

Pig Lead.—The market is in the hands of speculators, who have run up the price from 4.80¢ to 4.90¢. These high prices are bringing out stocks from consumers, who have made sales of several hundred tons at about 4.85¢.

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St.,
PHILADELPHIA, Pa., September 25, 1888.

Pig Iron.—A very decided feeling of strength has been apparent during the past three weeks, and is daily becoming more general. Prices have scored a clean advance of 50¢ per ton, although there are some who are still supplying their regular trade at the old figures, but should the improvement continue it is quite evident the advance would become general. As to the future course of the market it is difficult to pass an opinion, although the feeling at the moment is one of undoubted strength. There is some evidence of a slight hesitancy in purchasing at the advance, and if sellers will be satisfied with the present improvement in prices it is liable to prove a permanent one, and any further pressure toward higher figures, for the present at least, is almost sure to result disastrously, consequently a conservative course is the one to be followed, and will probably be adopted. Overproduction is one of the greatest evils to be avoided, and if this is successfully done the future of the market is in a measure assured. At

the present time the demand averages pretty well up to the supply. Meanwhile sales are being made on the basis of \$18.50 @ \$19 for No. 1 Foundry, \$17.50 @ \$18 for No. 2 and \$16.50 for Gray Forge, although choice brands in some cases command a trifle more money.

Foreign Iron.—No transactions to report; prices are nominally as follows: \$20 @ \$20.50, c.i.f. duty paid, for Bessemer and \$26 @ \$26.50 for 20 % Spiegel.

Blooms.—A fair amount of business is being transacted and prices are firm at about the following quotations: Nail Slabs, \$29 @ \$29.50; Billets from \$30 to \$35, f.o.b. cars at mill, according to analysis; Charcoal Blooms, \$52 @ \$54; Run-out Anthracite \$42 @ \$44; Scrap Blooms, \$33 @ \$35 @ "bloom" ton of 2464 lb. Foreign at tide, c.i.f., duty paid, \$29.50 @ \$30.50 for Nail Slabs; \$32.50 @ \$34 for 4 x 4 Billets, and \$35 @ \$39 for Siemens-Martin, price according to analysis, &c.

Muck Bars.—Quite a large trade is being done at about \$29 @ \$29.50 delivered. Inquiries are numerous, although generally at a little less than sellers are willing to take, consequently a number of orders are being held in abeyance, but holders do not seem inclined to shade their figures to any extent.

Bar Iron.—Trade in this department has been very large during the past two or three weeks, and the mills have been able to book a number of large and desirable orders, while some are well filled up to the end of November. Early deliveries are not obtainable except at full quoted rates, say 1.9¢ @ 1.95¢; although for good-sized orders 1.87½¢ might be accepted. Skelp has been somewhat active during the past week at 1.87½¢ @ 1.9¢, although bids are on the market at 1.85¢, but are not very anxiously sought after by sellers. The price of Bar Iron from store has been advanced from 1.9¢ to 2¢ per pound.

Plate and Tank Iron.—The mills all report a good business and indications point to a continuance for the next two months at least. Prices while not higher are quoted firm at about as follows: Ordinary Plate and Tank Iron, 2.05¢ @ 2.15¢; Shell, 2.4¢ @ 2.5¢; Flange, 3.5¢; Fire-Box, 4¢; Steel Plates, Tank and Ship Plate, 2.3¢ @ 2.4¢; Shell, 2.7¢; Flange, 3¢ @ 3½¢; Fire-Box, 3½¢ @ 4½¢.

Structural Iron.—Trade is somewhat slow in this department, but mills are, to a certain extent, well filled with old contracts, and, with such small orders as are received daily, are able to work pretty well up to their capacity. Prices show no change and are quoted as follows: 2.10¢ @ 2.15¢ for Bridge Plate; 2¢ @ 2.10¢ for Angles; 2.6¢ @ 2.7¢ for Tees, and 3.3¢ for Beams and Channels, Iron or Steel.

Sheet Iron.—The demand is a little slow, but stocks are not allowed to accumulate to any great extent, as mills are generally able to market what they make up without any serious trouble. Prices remain as last quoted—viz.:

Best Refined, Nos. 26, 27 and 28... 3¼ @ 3½¢
Best Refined, Nos. 18 to 25... 3 @ 3¼¢
Common, ¼¢ less than the above.
Best Bloom Sheets, Nos. 26 to 28... 4¼ @ 4½¢
Best Bloom Sheets, Nos. 22 to 25... 4 @ 4¼¢
Best Bloom Sheets, Nos. 16 to 21... 3¾ @ 3½¢
Blue Annealed... 2.8 @ 3¢
Best Bloom, Galvanized, discount... 62½¢
Common, discount... 67½¢

Merchant Steel.—The increased demand for the better grades of Steel continues to be the only feature. Prices remain unchanged, as follows: Tool Steel, 8½¢; Machinery, 2.6¢; Crucible Spring, 4½¢; Open-Hearth Ordinary Spring, 2.7¢ @ 2.9¢; Crucible Machinery, 5¢; Best Sheet Steel, 10¢; Ordinary Sheet, 8¢.

Steel Rails.—There is no improvement of any kind in this department. Orders

are scarce, but mills are kept fairly busy on outside specialties. Prices are nominally \$29, at mill, but it is intimated that this figure could be shaded on good sized orders.

Old Rails.—No sales of any consequence to note. There are a number of Rails held in store here, but holders do not seem anxious to name figures—at least not for the present—although bids are on the market at from \$23 to \$23.50, which, however, is somewhat less than holders expect to realize.

Scrap Iron.—Occasionally orders for good round lots are heard of, but the bulk of the trade at the moment seems to be in small-sized orders at about the following figures, say \$20.50 @ \$21 for cargo lots; \$21.50 @ \$22 for carload lots, delivered, or for choice \$22.50 @ \$23; No. 2 do., \$14 @ \$15; Turnings, \$13 @ \$14; Old Steel Rails, \$20 @ \$21; Cast Scrap, \$15 @ \$16; do. Borings, \$9 @ \$10; Old Fish Plates, \$25 @ \$26. Old Car-Wheels, \$17 @ \$18, Philadelphia, or its equivalent.

Wrought-Iron Pipe.—Mills are all busy and are well filled up with orders, although prices, for some unknown reason, continue weak and drooping. Discounts are quoted as follows: Black Butt-Welded, 55¢; on Galvanized do., 45¢; on Black Lap-Welded, 65¢; on Galvanized do., 52½¢; on Boiler Tubes, 60¢.

Nails.—It is very difficult to find anything of interest either as regards amount of business or prices. Only a limited number of Nails are being sold, and on account of the extreme competition from outside points it is difficult to sell at a figure that pays for the handling. Lots from store are quoted at \$2, with the usual discount on carload lots.

Cincinnati.

Office of *The Iron Age*, Fourth and Main Sts.,
CINCINNATI, September 24, 1888.

Pig Iron.—The market for Pig Iron here preserves its strength well, the recently published statistics fortifying producers in their positions. As was surmised a week ago, official statements for the month of August show a reduction of about 42,000 tons in stocks of Coke Iron and about 9000 tons in stocks of Charcoal Iron at the furnaces, and this reduction of stocks occurs at the same time that there has been an increased production of 10,000 tons, which is equivalent to an increased consumption of upward of 50,000 to 55,000 tons during the past nine months. But the fact that increased consumption is the rule at this season deprives the showing of much force which it might otherwise have. While the local market has been strong during the week the volume of business has been less; this is in part due to the retirement of a number of furnaces from the market, but at the same time buyers have not been importunate, yet inquiries have been frequent, the pulse, temperature and respiration of the market being accurately taken by all concerned. No very large sales have been recorded and the aggregate of small transactions has been less. Among the larger sales may be noted 2600 tons Southern Car-Wheel Iron at \$25, four months; 1000 tons No. 2 Southern Coke Foundry at \$16.50; 600 tons do. at the same rate, and 500 tons No. 2 Southern Forge at \$14.50. No. 1 Southern Forge has been sold at \$15.25 @ \$15.50, and about 600 tons Mottled Iron equivalent to \$13.50, cash, here. The following are the approximate quotations for the local market, cash, f.o.b. Cincinnati:

Hot-Blast Foundry.

Southern Coke, No. 1... \$17.50 @ \$18.50
Southern Coke, No. 2... 16.50 @ 17.50
Southern Coke, No. 3... 15.50 @ 16.10

Ohio Soft Stone Coal, No. 1... 17.00 @ 17.50
Ohio Soft Stone Coal, No. 2... 15.50 @ 16.00
Mahoning and Shenango Valley... 17.50 @ 18.50
Hanging Rock Charcoal, No. 1... 20.50 @ 22.50
Hanging Rock Charcoal, No. 2... 19.50 @ 22.0
Tennessee and Alabama Charcoal,
No. 1... 18.50 @ 19.50
Tennessee and Alabama Charcoal,
No. 2... 17.00 @ 18.00

Forge.

Strong Neutral Coke... 14.75 @ 15.25
Mottled Neutral Coke... 13.50 @ 14.00
No. 1 Mill Coke... 15.00 @ 15.50
No. 2 Mill Coke... 14.50 @ 15.00

Car-Wheel and Malleable Irons.

Southern Car-Wheel... 20.00 @ 23.00
Hanging Rock, Cold Blast... 22.00 @ 25.00
Lake Superior Car-Wheel and Malleable... 20.50 @ 21.50

Manufactured Iron.—The volume of business has been fair during the week, some new orders of moment being booked, and a firm tone has prevailed. Common Bar Iron, 1.90¢; Charcoal Bar Iron, 2.90¢ @ 3¢; Sheet Iron, Boiled, Nos. 10 to 27, 2.50¢ @ 3.25¢; Sheet Iron, Charcoal, Nos. 15 to 25, 3½¢ @ 4½¢ @ lb.

Nails.—There has been a fair jobbing demand, which has been readily met at previous range of prices, but there has been some change in the discount allowed. Jobbing prices are based upon 12d @ 40d, which sell at \$2.10 @ keg, with 10¢ rebate in carload lots, at mills. Steel Nails sell at \$2.10 and Steel Wire Nails at \$2.75 @ keg.

Old Material.—The market has apparently come to a halt. It is in a congested state, sellers having accumulated considerable stock at different points and demanding prices in excess of buyers' limits, have stopped the movement in this vicinity at least. Old Rails would probably sell at \$24, while sellers are not disposed to accept even \$25. Old Wheels are dull and nominally quotable at \$22, spot.

Cleveland.

CLEVELAND, September 24, 1888.

Iron Ore.—Sales of Bessemer Ore are reported at an average advance of 50¢ per ton over midsummer quotations. Transportation rates to lower lake ports have crept up to \$1.40 from Escanaba, \$1.60 from Marquette and \$1.85 from Ashland and Two Harbors. The tone of the market is certainly very firm at the advanced quotations, which are fully justified by the increased lake freights. The demand is excellent and many dealers report having declined orders that were thought to be in excess of the output of their mines. With the vessel interests steadily clamoring for higher carrying rates, mine owners have been even stronger than they would otherwise have been in their determination not to be driven into the position of having on hand, near the close of the season, large quantities of Ore already sold and obliged to be forwarded regardless of excessive freights. Scattering sales of Gogebic Bessemer have occurred during the past week at prices equivalent to \$5.35 @ \$5.45, f.o.b. cars Cleveland. Menominee Bessemer have sold at about \$5.40 and Red Hematites at \$5.25. The shipments for the season closely aggregate 3,250,000 tons, with a fair prospect of the output for 1888 reaching 4,000,000 tons.

Pig Iron.—The market is very active and the volume of business for the past week is probably quite equal to that of any preceding six days in August or September. Dealers would not, however, be surprised if business should be a little quiet for a month or six weeks. Producers of Bessemer Irons are not only well sold up, but have anticipated their output to such an extent that they will have practically nothing more to offer before the middle of November. Buyers, too, have purchased ahead of their immediate needs, and not very much is to be expected of them for a month or two. The situation is the natural result of the activity which has characterized the market since August 1st. The market

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Detroit.

WILLIAM F. JARVIS & Co., under date of September 24, report as follows: There has been very little change in the market during the past week. Considerable business has been transacted, and no concessions have been made in any case. Prices have been very firm at the advance recently reported. The confidence that prices will be higher in the future is shown by the number of buyers that desire to purchase who are not consumers of Iron. This is further demonstrated by the action of some large consumers, who placed orders about 60 days ago for their wants during the next six or eight months, but who have purchased during the past week an additional quantity almost equal to the original purchases. We quote for the present as follows:

Lake Superior Charcoal, all numbers.....	\$20.00 @ \$20.50
Lake Superior Coke, all ore.....	19.75 @ 20.25
Lake Superior Coke, cinder mixed.....	18.50 @ 19.00
Standard Ohio Black Band.....	19.75 @ 20.25
Southern No. 2.....	17.75 @ 18.25
Southern Gray Forge.....	16.25 @ 16.75
Southern Silvery.....	17.00 @ 17.50
Jackson County (Ohio) Silvery.....	18.50 @ 19.00
Old Wheels.....	20.50 @ 21.50

New York.

Office of *The Iron Age*, 66 and 68 Duane street, New York, September 26, 1888.

American Pig.—Representatives of Southern Pig Iron producers have been watching with some solicitude the reports of the yellow fever scare in the South, and news from Birmingham particularly has been closely scanned. Until now no traces of the epidemic in that town have been reported, and the latest advices are encouraging. Any outbreak there followed by a panic would very seriously influence the Pig Iron markets of the whole country. Every day successfully passed lessens the danger, as we are approaching the first frost. Still the trade should closely scan the reports from that section for the next week or two. Our market has been quite active, the notable event being the sale by the Thomas Iron Company during the latter part of last week of Mill and Forge Irons to the aggregate of about 20,000 tons, to rolling mills, Pipe founders, Stove manufacturers, and engine and machine builders at the season prices, for delivery during the balance of year. Through these sales the output of the Thomas Iron Company must now be pretty well provided for. We hear of a purchase of 1400 tons of Southern No. 1 at \$18.10, though the majority of representatives hold at \$18.50 @ \$19 for moderate lots. A 500-ton lot of Southern No. 2 Foundry has been offered at \$16.50, tidewater. In Mill Iron we hear of a small sale of Northern Iron at a shade under \$16. The Southern furnace companies have generally agreed to the following change in the grading, which some have been working under for some time past. This new grading is to go into effect on October 1:

New Grade.	Old Grade.
No. 1 Foundry.....	No. 2 Foundry.
No. 2 Foundry.....	No. 2½ Foundry.
No. 3 Foundry.....	No. 1 Mill.
No. 1 Soft.....	Open Bright.
No. 2 Soft.....	Close Bright.
Silver Gray.....	Silver Gray.
Gray Forge.....	No. 2 Mill.
	Mottled.
	White.

This will do away with a good deal of confusion and will be welcomed by Southern furnace managers. We quote standard brands: No. 1 Northern Foundry, which is scarce, \$18 @ \$19; No. 2, which is more plentiful, \$17 @ \$17.50, and Gray Forge, \$16 @ \$16.50.

Scotch Pig.—High prices are checking the demand. We quote for moderate lots: Coltness, \$21.75 @ \$22, nominally; Shotts,

\$20.50 @ \$21; Langloan, \$20.50 @ \$20.75, and Dalmellington, \$20.25 @ \$20.50.

Spiegeleisen.—Some sales are reported for Western delivery at private terms. The market has advanced, and importers are now asking \$27.75 @ \$28 for English, steamer shipments, although no business has been done at these figures. Foreign Ferromanganese is held at \$54 @ \$54.50 nominally.

Plates.—An important circular has been issued by Carnegie, Phipps & Co., through their Eastern agent, H. L. Waterman, Mills Building, this city. The announcement is made that as Soft Steel Plate is taking the place of Iron for bridges, ship, tank and structural work generally they have decided to make prices for Sheared and Universal Rolled Plate of these grades as low as are quoted for Iron Plates for similar purposes. We quote Iron Tank, 2.1¢ @ 2.2¢; Shell, 2.3¢ @ 2.4¢; Steel Tank, 2.2¢ @ 2.3¢; Shell, 2.4¢ @ 2.5¢; Flange, 2.65¢ @ 2.75¢, and Fire-box, 3.5¢ @ 4¢.

Structural Iron.—The majority of manufacturers are fully employed, though current orders are for small quantities mainly. We quote Sheared Plates, 2¢ @ 2.1¢; Universal Mill Plates, 2.1¢ @ 2.2¢; Angles, 2.1¢ @ 2.15¢; Tees, 2.5¢ @ 2.6¢, and Channels and Beams, 3.3¢.

Steel Rails.—Sales during the week by Eastern and Western mills foot up to about 18,000 tons in the aggregate, the bulk of the business being done by Western mills for Western roads. Inquiries are in the market almost exclusively by Western roads for winter and spring work, aggregating about 75,000 tons, 30,000 tons thereof being for one system. A part of them, probably, are in the nature of feelers; others are from roads which usually buy early and decide promptly whenever they have entered the market. It is not likely that the Eastern mills will touch any of this business, because relatively prices in Chicago are lower at \$30 there than \$28, which is the usual price now at Eastern mills. The first step must therefore be that the Western mills fill their order books at least partly. Some uncertainty exists among Rail-makers as to next year's business. All of them have worked off accumulations of cheap raw material pretty well and could not now replace Ore Pig, Spiegeleisen or Coke at the same low prices, although that point has not been seriously tested except in a few isolated cases. These circumstances would point to higher prices. On the other hand, many manufacturers are usually willing in order to secure a start on their order books to accept early contracts at close figures. An error crept into our report last week in regard to sales thus far for 1889. Up to September 1st, according to the official report the sales had aggregated 26,430 gross tons. We quote \$28 @ \$28.50, with rumors of sales for winter delivery at a shade under.

Blooms and Billets.—Very little is doing in Foreign which are quoted \$30.50 @ \$31 for sailer shipment, and \$31.50 @ \$31.75 for steamer shipment.

Wire Rods.—The market is dull at \$39.50 @ \$40 for small lots and no demand for large quantities.

Old Rails.—The position remains strong, the stock here having now dwindled down to less than 5000 tons, held by three strong parties. We note a sale of 2000 tons of T's from an American road at \$26.25, Pittsburgh, and of 6000 sold by an Eastern road at \$25.50, delivered at Ohio mills. A correspondent in Louisville writes of a sale of 1500 tons at \$24, spot cash, f.o.b. cars Cincinnati or East St. Louis, as the buyers may elect. The majority of the Eastern roads have now disposed of their holdings, and

what little there is here now could be swept away by one buyer. Holders ask \$25 for T's and \$26 for Double Heads. C.i.f. prices, by private cables, make foreign T's 70/ and Double Heads 75/, which would be equivalent to the figures quoted.

Old Steel Rails.—We note a sale of 1200 tons of Old Steel Rails delivered at Ohio points at \$20.

Scrap.—The market is quiet, holders asking \$21 for No. 1 from yard. We note a sale of 300 tons R.R. at \$23.50 delivered at Cleveland, and 100 tons of Axles at \$28.

Swedish Iron.—The market is quiet. We quote Rough Bars \$56. Store assortment, \$60 @ \$61, and Wire Rods \$53.50 @ \$54.

Fastenings.—Manufacturers are asking \$2.25, delivered, for Spikes. Dilworth, Porter & Co., are expected to resume on October 15th. Angle Bars are 2.05¢ @ 2.10¢.

Axles.—We quote Scrap Axles 2.15¢ @ 2.25¢, and Muck and Steel Axles 2.4¢ @ 2.5¢.

Financial.

While complaints come from some quarters that the fall trade is backward and hardly equal to expectations, there has been a general agreement that the business situation is satisfactory. Within the last few days, however, the Southern scourge has assumed a more threatening appearance, completely suspending traffic on important thoroughfares, until now it is reported New Orleans is not accessible by interior routes with any degree of certainty, except by way of Montgomery in Alabama, and even that route is threatened. Business in consequence is prostrated through a large section of country. It is inevitable therefore that traffic for a month or two must be seriously interrupted, until frost shall check the progress of disease. Several Northern railroads already refuse to receive freights from points below Charleston, and a telegram from Atlanta says it is probable the Memphis and New Orleans trains will be discontinued. Ex-President Norton, of the Louisville and Nashville Railroad Company, expresses the opinion that with the return of frost matters will soon resume their normal condition, and that Southern roads will suffer no material loss through the epidemic. Turning to the more cheerful aspects of the situation the important fact is announced by authority that an unprecedented corn crop is secured, equal to the enormous aggregate of 2,015,000,000 bushels; an increase of 559,000,000 bushels, or over 38 %, compared with 1887, and for the seven surplus States a gain of 520,000,000 bushels, or 66 %, the latter a gain of 60,000,000 bushels for the same group of States compared with the previous largest production in 1885. After a temporary decline of prices for wheat, in the absence of an export demand, wheat in Chicago touched the dollar mark, and millers at Duluth on Monday marked up wheat 4¢ per bushel, New York following with an advance. Wheat in this market again jumped on Tuesday, cash wheat or what is termed No. 2 Red selling at \$1.02, and flour again advanced, the best Minnesota selling at \$6.25¢ @ \$6.40¢. Corn was weak. Provisions were lower on yellow fever reports. Lard was excessively dull. Oil advanced sharply on buying orders. Cotton quiet at steady prices for spot stock. Advices from the Liverpool Exchange were that cotton-sheeted bales would be accepted as good delivery. Grocery jobbers reported that the early fall trade was the largest for some years. Coffee is disturbed by speculation. Sugars are firmly held.

The Stock Exchange market was subject to varying phases, following the extraordi-

any depression in St. Paul and reports that English shareholders were attempting to control the road. On Thursday it was announced that the Interstate Commerce Commission had decided that it cannot order the Burlington and Northern to advance its rates, even though they are unremunerative. The Chicago, St. Paul and Kansas City Road is also prohibited from further violating the fourth section of the Interstate law. On Friday a break occurred in Louisville and Nashville owing to free selling on the reports from the South of the spread of yellow fever. On Saturday there was more liberal selling of the grangers and the coal shares, but in the late trade the market partially recovered. On Monday there was again a lower tendency. On Tuesday the market was dull, closing firm.

United States bonds are quoted as follows:

U. S. 4½s, 1891, registered.....	107½
U. S. 4½s, 1891, coupon.....	107½
U. S. 4s, 1897, registered.....	128½
U. S. 4s, 1897, coupon.....	129½
U. S. currency 6s.....	121

The weekly bank statement showed a loss of nearly \$500,000 in surplus reserve, which now stands at \$11,943,625, against \$5,816,725 at the corresponding time last year, and \$9,079,875 in the second week of September, 1888. In loans there was a contraction of \$492,200. Specie showed an increase of \$826,400 and legal tenders decreased \$1,626,100, reflecting the continued movement of currency to interior points. Deposits decreased \$1,279,400. The large purchases of bonds by the Treasurer of late supplied the banks with all needed funds. The total amount of bonds purchased to date under the circular of April 17 is \$53,266,800, of which \$35,400,850 are 4s, and \$17,865,950 are 4½ per cents. The cost of the 4s was \$45,315,268, and of the 4½s \$19,183,895, making the total cost \$64,499,163. Notwithstanding these purchases there is still an excess in the receipts over the expenditures since the 1st inst. of \$15,000,000. Treasury purchases, together with heavy interest disbursements October 1 and Congressional appropriations, will go far toward providing money to meet the usual autumn demand. Money on call averages about 2%. The rates on time loans, most of which were made by trust companies and out-of-town institutions, were 4½ to 5½% for four to six months. Commercial paper was in abundant supply, and the demand was light. Rates were for 60 to 90 days' indorsed bills receivable 5½ to 6%, for first-class four months' commission house names 5½ to 6½% and longer dates 6 to 7½%.

Sterling exchange was lower; actual rates, \$4.84 @ \$4.88. With free cotton exports later in the season, the receipt of gold from Europe is not improbable.

The clearings of 38 cities for the week ending September 22 were \$1,113,797,755, against \$991,174,669 last year, an increase of 12.4%. Outside of New York the gain was 5.9%. New York increased 13.5; Boston, 2.3; Philadelphia, 4.3; Chicago, 13.9; St. Louis, 19.8; Kansas City, 12.5; Louisville, 24.7; Omaha, 13; Minneapolis, 7.7; Denver, 36.1, and Duluth, 36.6%. Cincinnati decreased 3.2; Milwaukee, 3.9; St. Paul, 7.7; Memphis, 36.9; Wichita, 24.4, and Norfolk, 23.8%. The gross earnings of 81 railroads from January 1 to July 31 show an increase of \$10,225,660, or 4%. The weekly reports for September indicate an increase varying from 2 to 3%.

The exports of specie from this port during the week were \$535,000, and the imports \$150,000. Since January 1 the amounts, respectively, are \$28,225,000 and \$6,589,000.

The imports of merchandise at this port during the week were valued at \$8,271,000, of which \$2,000,000 represents dry goods.

The total since January 1 is \$343,646,000, as compared with \$345,115,000 for the same time last year and \$318,872,000 in 1886. Exports for the week were \$6,773,000; total since January 1 \$211,940,000 as compared with \$225,795,000, for the same time last year.

The new bank organized by the hat trade in New York with a capital of \$250,000 is named the Empire State Bank. James W. Conrow was elected president.

The Philadelphia mint during the fiscal year ended June 30 struck off coinage pieces in numbers exceeding 88,000,000 and in value \$25,982,957.52, and the operations of the establishment yielded a profit of \$5,236,000 above the working expenses and exclusive of the profit on silver bullion purchased.

Imports.

The imports of Iron and Steel, Hardware, &c., at this port from September 17 to September 23, inclusive, and from January 1 to September 23, inclusive, were as follows:

Iron and Steel.			
	Sept. 17 to Sept. 23.	Jan. 1 to Sept. 23.	
	Tons.	Tons.	
Iron Ore: Bowering & A. & Co.	100	4,000	
Pig Iron: James Williamson & Co.	400	12,450	
G. W. Stetson & Co.	200	8,273	
Crocker Bros.	100	4,300	
N. S. Bartlett.	50	50	
R. Crooks & Co.	50	50	
Richard Irving & Co.	800	8,019	
Spiegelstein: Naylor & Co.	345	4,232	
Crocker Bros.	200	10,552	
J. A. Jansen.	28	75	
Steel: Pierson & Co.	65	432	
R. H. Wolf & Co.	13	340	
F. S. Pilditch.	11	1,102	
W. F. Wagner.	10	18	
J. S. Leng's Son & Co.	9	199	
M. Cohn & Co.	5	220½	
Chas. Huggill.	4	125	
Newton & Shipman.	4	182½	
C. F. Boker.	3	10	
J. G. Wilson.	1	1,012	
A. Milne & Co.	640	3,190	
Steel Rods: Dana & Co.	25	708	
Cary & Moen.	900	1,025	
Steel Blooms: Dana & Co.	336	336	
Steel Crop Ends: W. H. Walbaum.	30	36	
Steel Sheets: Henry Whittemore & Co.	20	899	
Pierson & Co.	10	10	
A. R. Whitney & Co.	50	95	
Steel Hoops: Jas. Lee & Co.	15	257	
Steel Bars: A. Milne & Co.	50	3,548½	
Steel Forgings: Thos. Prosser & Son.	48	48	
Steel Plate Cuttings: Naylor & Co.	29	29	
Iron: C. S. Mersick & Co.	1,000	4,700	
Ferromanganese: C. L. Perkins.	390	440	
Charcoal Iron: Naylor & Co.	12	140	
Muller, Schall & Co.	40	1,118	
Sheet Iron: T. B. Coddington & Co.	150	3,987	
Rivet Rods: J. Abbott & Co.	51	837	
J. A. Roebbing's Sons.	17	17	
Iron Beams: Post, Martin & Co.	85	338	
Swede Iron: A. Milne & Co.	58	58	
Bacon & Co.	10	10	
H. N. Holt.	21	21	
Swedish Rods: Muller, Schall & Co.	4	4	
Iron Channel Beams: J. G. Wilson.	378	4,937	
Cotton Ties: Naylor & Co.	200	450	
Wheelock & B.	50	395	
J. S. Leng's Son & Co.			

Tin Plates.

	Boxes.	Boxes.
Phelps, Dodge & Co.	4,822	397,824
Dickerson, Van Dusen & Co.	4,367	200,287
T. B. Coddington & Co.	3,635	129,113
Pratt Mfr. Co.	4,253	132,966
R. Crooks & Co.	1,384	53,698
A. A. Thomsen & Co.	1,172	99,449
Merchant & Co.	675	17,397
Bruce & Cook.	609	76,081
G. B. Morewood & Co.	500	36,189
Corbiere, Fellows & Co.	500	6,858
Jas. Byrne & Son.	303	28,552
N. L. Cort & Co.	308	79,284
N. H. Fairbanks.	214	264
E. S. Wheeler & Co.	110	5,710

Metals.

	Pounds.	Pounds.
Tin: Naylor & Co.	235,147	2,192,366
American Metal Company.	67,200	1,203,625
A. A. Thomsen & Co.	22,419	144,477
Jas. E. Pope, Jr.	22,339	214,947
R. Crooks & Co.	8,430	414,502
Nickel: McCoy & Sanders.	5,150	142,780
Old Brass: J. M. Ceballos & Co.	18,250	13,260

Irons and Metals Warehoused from September 17 to September 23, inclusive:

	Tons.
Charcoal Iron: N. Lillenberg.	200

Hardware, Machinery, &c.

Bernard Geo., Ironwork, cs., 7	
Boker, Hermann & Co., Mdse., cs., 5; Arms, cs., 38	
Clark Thread Company, Mach'y, cs., 70	
Crabb, Wm., & Co., Mach'y, cs., 10	
Curley Bros., cs., 2	
Douglas, W. B., Mach'y, cs., 3	
Field, Alfred & Co., Mdse., cs., 90; Gun Caps, cs., 22	
Folsom, H. & D., Arms, cs., 24	
Gurney, F. B., Mdse., cs., 4	
Graef Cutlery Company, Cutlery, cs., 6	
Keydel, H. & Co., Arms, cs., 30	
Lau, J. H. & Co., Arms, cs., 15	
Newton & Shipman, Files, cs., 2	
Pim, Forwood & Co., Boiler Tubes, 200	
Schoverling, A., Arms, cs., 36	
Shoverling, Daly & Gales, Arms, cs., 41	
Strauss, Blumenthal & Co., Hdws., cs., 1	
Tryon, E. K. & Co., Mdse., cs., 18	
Webbusch & Hilger, Lm., Mdse., cs., 47	
Williams & Rankine, Hdws., cs., 1	
Order: Rivets, cs., 12; Shaft, 1; Propeller, 1	

Exports of Metals.

	September 17 to Sept. 23.	Jan. 1 to Sept. 23.
	Pounds.	Pounds.
Copper: J. Abbott & Co.	225,000	10,895,619
Lewisohn Bros.		3,929,022
F. A. Lomal.		2,581,233
American Metal Company.	88,750	5,240,384
G. H. Nichols.		223,889
J. Bruce Ismay.		112,000
S. Mendel.		560,000
Ledoux & Co.		110,276
Muller, Schall & Co.		430,000
Copper Queen Con. M. Company.		220,084
J. Kennedy, Tod & Co.		112,028
H. Becker & Co.		1,250
Orford C. & S. Rfg. Company		449,881
Robt. M. Thompson.		125,000
Thos. J. Pope, Sons & Co.	26,000	1,132,130
J. Parsons & Co.	213,750	420,000
Naylor & Co.		280,000
Bridgeport Copper Company.		112,000
C. Herold.		250,000
Phelps Bros.		6,250
R. W. Jones.		189,984
Ladenburg, Thalmann & Co.		229,371
W. H. Croesman & Bro.		4,000
R. Crooks & Co.		1,000
Copper Matte: Williams & Terhune.		84,382,598
Lewisohn Bros.		3,621,610
American Metal Company.	179,200	2,416,073
J. Abbott & Co.		295,000
C. Ledoux & Co.		485,800
F. W. J. Hurst.		184,288
G. H. Nichols.		722,777
H. T. Nichols & Co.		180,996
Kunhardt & Co.		41,652
Pig Iron: P. Wright & Sons.	100	380

Coal Market.

The Anthracite Coal market is easier, and it is not probable the heavy business done of late will be continued in October. The large operators already show some disposition to curtail production, the output from the three mining districts having dropped during the week ended September 22 to 869,136 tons, which is a decrease of 66,000 compared with the previous week, Wyoming alone falling off nearly 50,000 tons. Nevertheless, the amount of Coal passing into consumers' hands is extraordinary as the companies as a rule have no large accumulations. Compared with the corresponding week last year, the output now reported is 256,000 tons larger, and since January 1 the excess is upward of 2,000,000 tons. The comparison by weeks since the climax of the season is as follows:

Week ended August 18.	920,922
Week ended August 25.	832,058
Week ended September 1.	844,665
Week ended September 8.	881,802
Week ended September 15.	935,523
Week ended September 22.	869,136

Broken Coal is accumulating, and the smallest Steam sizes are in excess, but for sizes most in demand prices are said to be firmly held. Quotations are as follows:

	Broken.	Egg.	Stove.	C'nuff.
Hard white ash.	\$4.15	\$4.40	\$4.65	\$4.55
Free white ash.	3.95	4.30	4.65	4.55

Pea is quoted \$2.75, but can be bought much lower, and fancy grades range about \$4.50 @ \$5. Lehigh, f.o.b. at loading ports: Lump, \$4.50; Broken, \$4.25; Egg and Stove, \$4.60; Chestnut, \$4.70.

The official Coal figures for August show a production of 4,097,000 tons, and 898,000 tons increase over August, 1887. This is the heaviest August output known, and, notwithstanding the great produc-

tion, the stock of Coal at tide decreased 307,000 tons during the month, showing that the market absorbed about 4,405,000 tons.

Bituminous Coal is being delivered freely on contracts, and business is done on the pool basis of \$3.50, alongside. Cumberland reports 70,000 tons for the week, and Clearfield 61,863 tons, which is an increase of 15,000 in shipments from these sources, compared with the same time last year.

Metal Market.

Copper.—At the time of our last report spot Chili Bars stood £95 in London, giving way to £94 the next day, but recovering to £100 yesterday, since when there is no change. Futures meanwhile temporarily gave way from £79 to £78. 15/, but are now £79 once more. Best Selected has been £80. 10/. Good merchantable brands improved from £77. 2/6 to £78. 5/ to-day. Total sales 1600 tons. Here very little has transpired. Consumers that may stand in need of Copper are supplied by the syndicate at 16½¢, while bears, to cover outstanding futures, have to pay 17½¢, which is also the figure for December delivery. There is some agitation in and out of Congress to put Ingot Copper on the free list. Whether anything will be done in that direction seems to us doubtful. The total output of ten Lake mines is given as under for the first eight months:

	1888. Tons.	1887. Tons.
Calumet and Hecla.....	19,313	20,688
Tamarack.....	5,001	2,737
Quincy.....	2,630	1,821
Atlantic.....	1,850	1,634
Oscuela.....	1,667	1,327
Franklin.....	1,463	1,607
Huron.....	949	487
Central.....	723	765
Copper Falls.....	487	380
Kearsage.....	72	...
Totals.....	34,155	31,426

The export of domestic Copper during the first seven months has been 22,740,924 lb, against same time last year, 8,247,368. The London *Economist*, in its last issue, prints an article which we reproduce in full:

THE PROFITS OF THE FRENCH SYNDICATE.—A correspondent, who writes with an intimate knowledge of the Copper market, has favored us with the subjoined estimate of the financial results, to the 1st inst., of the operations of the French syndicate. He thinks "they will prove rather a revelation to the public, who imagine that the profits of the syndicate are already very large." His calculation is:

Estimated Quantity of English and Foreign Copper Held by the French Syndicate.	
On September 1 (Chili Bars)...	50,000
(other Copper).....	50,000
On January 1.....	100,000
Increase in stock in eight months...	65,000
Total Import of Copper into England and France, Including Pyrites.	
January 1 to September 1.....	95,000
Gone into consumption.....	30,000
Estimated quantity of Copper delivered by other holders than the syndicate.....	10,000
Sold by the syndicate.....	20,000
	30,000
Cost of 100,000 Tons Copper held on September 1.	
50,000 tons Chili Bars, at.....	£71
25,000 tons taken over from Société des Métaux, January 1, at.....	64
25,000 tons since purchased, at average price of.....	78
	Per ton.
50,000 tons other copper, at contract price of 13/ per unit.....	£70 for best select.
Average price.....	77 for best select, 1st Jan. to 1st Sep.
Profit.....	£7

No Chili bars sold during this period to consumers.
Profit on 20,000 tons sold by the syndicate at £7 per ton..... 140,000
Interest on estimated average quantity held by syndicate during eight months—viz., 70,000 tons at £70 per ton, or £4,900,000 at 4 per cent. per annum for eight months..... 130,000
Present interest per annum on 100,000 tons, at £70 per ton, or £7,000,000, at 4 per cent. per annum..... 280,000
To this must be added brokerages, bank commission, rents, charges, &c.

In this connection reference may be made to a statement in the *Journal des Mines*, to the effect that a new contract has been entered into between the syndicate and Copper producers, to take effect on the expiry of the current three years' agreement. The terms of this new contract are thus set forth: "According to the arrangements at present in force the syndicate takes the production of the mines at a minimum of £62. 10/ per ton in the case of the Rio Tinto, of £64 for the Calumet and Hecla, of £65 for the Mason and Barry, and of £70 for the Tharsis and the Cape Copper Companies. Further, the syndicate pays the cost of storage, insurance, &c., and after receiving £5 per ton on account of its services shares all excess profits with the companies. According to the new combination the syndicate binds itself to take all the Copper produced by all the companies, at a uniform price of about £72. 10/ per ton. It further abandons its claim for £5 per ton in excess of the minimum price, and shares equally with the companies in the profits remaining after all expenses have been paid." It would thus appear that the syndicate in their efforts to maintain their position have been compelled to assume much heavier obligations than before.

Rio Tinto shares improved, at Paris, 51½ francs, there being quite a revival in Copper-mining share speculation over there.

Tin.—The fluctuations in the London market have been comparatively unimportant. From £108. 10/, spot, the price improved temporarily to £108. 17/, and is now £103. 15, after touching £108. 10/ yesterday. Futures gave way from £104 to £102. 15/ and are to-day £103. Jobbers have been getting 23½¢, and, in a speculative way, the price has ruled at 23.25¢ September, 23.20¢ @ 23.40¢ October and 23¢ November, but trifling lots changing hands, the general feeling being one of apathy. The Banca sale in Holland came off at 63 guilders per 50 piculs. During the first seven months there were shipped from the Straits Settlements to the United States 16,520 piculs of Tin, against the following amounts in preceding years: 1887, 46,858; 1886, 40,708; 1885, 16,471; 1884, 37,408, and 1883, 67,119; the import into the United States was simultaneously 19,386,874 lb, against 16,524,743 in 1887, while the re-export was 113,614 and 102,484 lb respectively. At the Metal Exchange 10 tons October Tin brought 28.45¢ to-day. **Tin Plates.**—There has been a fair demand for Plates, both spot and futures, although there is not much inducement now to buy the latter, as the present price approximates very closely to spot stocks. The advances noted in our last still hold. Liverpool is firm at 14/ for Cokes, makers being well booked for two months ahead. The import into the United States during the first seven months has been 388,521,775 lb, against 377,523,392 lb same time last year, while the re-export has respectively been 649,896 and 972,911. We quote at the close, large lines, per box: Siemens-Martin Steel, Charcoal finish, \$5.25 @ \$5.75; Coke finish, \$4.75; Terns, \$4.80 @ \$4.40; Bessemer Cokes, \$4.65, and Wasters, \$4.30.

Lead.—There changed hands on the Metal Exchange since our last report, altogether, 212 tons of Lead at 4.95¢ @ 5¢, both September and October. Consumers now and then buy a small lot and pay 5¢, which is the price to-day; yesterday they paid 5.05¢ for 50 tons of an extra brand. At Chicago and St. Louis the price has risen from 4.80¢ to 4.90¢. In London Soft Spanish improved from £14.7/6 to

£14.12/6, while English Pig rules at £14.17/6.

Spelter.—The demand here has been moderate at 5.10¢ @ 5.15¢ for near delivery and October, but Silesian, now worth £19 in London, cannot be had for less than 5.90¢.

Antimony.—Is quite strong at 12½¢ @ 13¢ for Cookson, and 10½¢ Hallett, the stock being light, and the demand good. London remains steady at £39 for the latter.

New York Metal Exchange.

The following sales are reported:

THURSDAY, September 20.	
25,000 lbs. Lake Copper, November.....	17.50¢
116 tons Lead, October.....	5.00¢
FRIDAY, September 21.	
50,000 lbs. Lake Copper, January.....	17.55¢
25,000 lbs. Lake Copper, January.....	17.50¢
SATURDAY, September 22.	
10 tons Tin, October.....	23.20¢
32 tons Lead, September.....	4.95¢
16 tons Lead, October.....	4.97½¢
MONDAY, September 24.	
10 tons Tin, November.....	23.00¢
TUESDAY, September 25.	
25,000 lbs. Copper, December.....	17.50¢
48 tons Lead, October.....	5.00¢
WEDNESDAY, September 26.	
10 tons Tin, October.....	23.45¢
10 tons Tin, October.....	23.40¢
16 tons Lead, October.....	5.02½¢

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]
LONDON, WEDNESDAY, Sept. 26, 1888.

There have been no important developments in the market for Copper or Block Tin. Both commodities are, apparently, in practically the same position that they were a week ago, and, apart from a sharp rise on Chili Bar prompts, due mainly to purchases for cornering "short" sales, the fluctuations of prices have been unimportant. The local stock of Tin is very moderate, and the available supply afloat is small as well. The opportunity is thus afforded for running prices up prior to the arrival of fresh supplies from the Straits, but as yet evidences are wanting of any contemplated movement in that direction. Speculation in Copper has been spiritless and consumers' purchases small, with outside brands substituted as far as practicable for Chili Bars.

The demand for Tin Plate, particularly from the American market, is checked more or less by the continued upward tendency of prices for all varieties. Makers are, however, so well supplied with orders that they accept new business only at their own prices. The report has circulation that prominent parties are negotiating for the erection of no less than four new works of considerable capacity.

Nearly all branches of the Steel trade continue active. Shipbuilding sorts and Rails figure most prominently, large orders having been placed the past week in both branches. Prices are very firm all through.

The Pig Iron market has displayed scarcely the degree of buoyancy that prevailed the preceding fortnight. Still, the amount of stock taken up by consumers and for export has been considerable and prices show scarcely any reaction from the highest point, except in the instance of warrants, which are a fraction off.

Scotch Pig.—There has been a fairly active trade in makers' Iron, and the market retains a firm tone:

No. 1 Coltness, f.o.b. Glasgow.....	51/
No. 1 Summerlee, " ".....	52/
No. 1 Gartsherrie, " ".....	48/6

No. 1 Langloan, " "	50/3
No. 1 Carnbroe, " "	44/
No. 1 Shotta, " at Leith.	49/
No. 1 Glengarnock, " Ardrossan.	47/
No. 1 Dalmellington, " "	43/6
No. 1 Eglinton, " "	42/6
Steamer freights, Glasgow to New York, 10/	
Liverpool to New York, 10/	

Cleveland Pig.—Business in this line not so large, but still of good total and at full prices. No. 1 Middlesboro', G.M.B., 37/6; No. 3 do., 35/.

Bessemer Pig.—The demand has continued brisk, and values remain firm. West Coast brands, mixed numbers, 45/9 @ 46/, f.o.b. shipping point.

Spiegeleisen.—Sellers are very firm and report a good demand. English 20 % quoted 77/8, f.o.b. N. W. England shipping point.

Steel Rails.—The market continues strong and active. Standard sections quoted at £4.1/3 @ £4. 2/8, f.o.b. at N. W. England shipping point.

Steel Blooms.—Demand is good and the market very firm. We quote £4 for 7 x 7, f.o.b. at N. W. England shipping point.

Steel Billets.—A fairly active business reported, with prices very firm. Bessemer, 2½ x 2½ inch, £4. 1/3, f.o.b. at N. W. England shipping point.

Steel Wire Rods.—Demand somewhat better, but prices without change. Mild Steel No. 6 quoted at £5. 18/6 and No. 5 at £5. 17/, f.o.b. at N. W. England shipping point.

Steel Slabs.—A fair business passing, at firm prices. Bessemer, £4, f.o.b. at N. W. England shipping point.

Old Rails.—The market remains very firm, with demand fair. Tees quoted at £2. 17/6, and Double Heads £3, f.o.b.

Scrap Iron.—A moderate business, but prices firm. Heavy Wrought quoted at £2. 7/6 @ £2. 10/, f.o.b.

Crop Ends.—Demand runs fair and prices remain firm. Bessemer quoted £2. 7/6 @ £2. 10/, f.o.b.

Manufactured Iron.—Business in all branches is still brisk, and prices are strong. We quote, f.o.b. Liverpool:

Staff. Ord. Marked Bars....	£ s. d.	£ s. d.
Common " " " " " "	@ 7 12 6	
" " " " " " " "	@ 5 0 0	
" " " " " " " "	@ 7 0 0	
" " " " " " " "	@ 4 17 6	

Tin Plate.—There is still a good demand, but the high prices asked check business. We quote, f.o.b. Liverpool:

IC Charcoal, Allaway grade.....	15/8 @ 15/9
IC Bessemer steel, Coke finish.....	13/9 @ 14/
IC Siemens " " " " " " " "	14/ @ 14/8
IC Coke, B. V. grade.....	13/6 @ 13/9
Charcoal Terne, Dean grade.....	13/ @ 13/6

Tin.—The dealings moderate and prices irregular. Straits quoted at £108. 10/, spot, and £103 @ £108. 5/ for three months' futures.

Copper.—There is no material change in the condition of the market. Chili Bars, £95 @ £100, spot, and £78. 10/ @ £79, hree months' futures. Best Selected, £79.

Lead.—The market strong and fairly active. Soft Spanish, £14. 10/ @ £14. 12/6.

Spelter.—Transactions only fair, but prices firm. Silesian, ordinary, £18. 15/ @ £19.

Mr. J. F. Robinson, of the iron brokerage firm of Robinson & Orr, has returned from a brief trip to Europe. Mr. Orr made the trip in the summer of 1887.

Foreign Markets.

EQUIVALENTS

Franc, Peseta or Lira.....	Cents.
Florin (Netherlands).....	19.3
Florin (Austria).....	40.2
Florin (Portugal).....	35.9
Milreis (Brazil).....	\$1.08
Mark (Germany).....	23.3
Kilogram.....	Pounds.
Picul.....	220.5
	184.

BRAZIL.

PARA, September 21, 1888.—*India Rubber.*—In response to the advance in Fine at Liverpool to 35d, the market here exhibits great strength. The amount shipped to New York so far this month does not exceed 240 tons, by two steamers.—*Per cable direct.*

CHILI.

VALPARAISO, July 20, 1888.—*Copper.*—There has been some activity in three months' futures, 11,600 quintals being taken at \$29.45 @ \$29.60 per quintal, which equals £75. 5 11 per ton to England, with 27/6 steam freight. *Nitrate.*—In spite of the decline in Europe and America, makers have remained firm, getting \$2.70 for 95 % on the spot and \$2.75 @ \$2.77 1/2 futures, which is above foreign parity. Sales aggregate 227,000 quintals; \$2.70 equals 8/3 1/2 in England with 28/9 freight. The June shipments amounted to 794,534 quintals.

Shipments During the First Six Months:

	1888. Quin- tals.	1887. Quin- tals.	1886. Quin- tals.
To Northern Europe.....	4,930,680	4,081,205	2,547,518
To the Medi- terranean....	103,334	156,538	92,312
To the United States on the Atlantic.....	826,268	976,928	944,264
To the United States on the Pacific.....	90,938	142,296	118,069
Totals.....	5,951,220	5,306,962	3,702,163

The fortnight's charters have been 29,200 tons for Europe. *Coal.*—The last two days Coal on the spot, has dropped from 56/ for New Castle to 46/. *Afloats* are also lower, May sail being quoted 40/, and June, 37/; Australian July sail, 37/. *Exchange*, 90 days' bank bills, 26d.—*Weber & Co.*

EAST INDIES.

SINGAPORE, August 3, 1888.—*Tin.*—Receded during the week to \$33.50 per picul, but subsequently recovered to \$34.50, in order to close at \$34.25. During the first seven months there have been shipped to England 94,256 piculs, against 32,401 during the corresponding period of last year, and 33,917 in 1886; to the Continent, respectively, 9129, 18,880 and 15,691, and to the United States, 15,907, against 34,654 and 22,695. *Gum Damar* has sold in a small way at \$14 per picul Siam, and \$21 fair Palembang. *Gutta Percha* is scarce, and wanted at a slight improvement. We quote Prime, \$90 @ \$110; Medium, \$50 @ \$75, and White, \$17 @ \$40 per picul. *Exchange* on London, four months' bank, 3/0 1/2.—*Giffillan, Wood & Co.*

SINGAPORE, September 19, 1888.—*Tin.*—During the first half of the month there have been shipped from the Straits Settlements to the United States 400 tons, against same time last year, 200; since January 1, 1880, against 3750; to England, September 1 to 15, 800, against 400; January 1 to September 15, 13,200, against 9200.—*Giffillan, Wood & Co., per cable to Charles Nordhaus, 89 Water street, New York.*

MANILA, September 17, 1888.—*Hemp.*—Our market has been quiet at \$9.87 1/2, against same date last year \$10, equaling per ton, cost and freight, £32. 17/6, against £35. 17/3. Since our last cable there have been no clearances for the United States; since January they amount to 125,000 bales, against 150,000 last year, and there are still loading 50,000, against 50,000 in 1887. Clearances for England since January 1 aggregate 246,000 bales, against 156,000 in 1887; there remain loading 8000, against none; cleared for all other ports 53,000, against 30,000; receipts at all ports since last cable, 12,000, against 10,000; ditto, since January 1, 439,000 bales, against 354,000 last year, and 289,000 in 1886. *Freight*, \$6, against \$5.50. *Exchange*, 3/5 1/2, against 3/9.—*Ker & Co. to Charles Nordhaus, New York, per cable.*

ITALY.

GENOA.—September 12, 1888.—*Hardware.*—The import of Hardware and Brass Goods into Italy is chiefly, nay, almost exclusively, from Germany. *Agricultural Machinery and Implements.*—We import from England owing to the credit system which has been introduced in this branch, enabling the landed proprietor

to pay for the machines in installments spread over three years. *Machinery for Manufacturing Purposes.*—We receive from France, because it combines good qualities with cheapness. *Smaller Machines.*—Germany supplies, because they are cheap on the one hand, and they can be sold on credit on the other. *Sewing Machines.*—We import from Vienna. *In Fire Arms.*—Belgium, Germany, Austria and France all compete for the Italian trade. Belgium sells, however, by far the bulk, owing to good quality combined with cheapness.—*La Patria.*

HOLLAND.

ROTTERDAM, September 12, 1888.—*Tin.*—The Tin movement in Holland in August has been as follows:

	Banca. 1888. July 31.	1888. Aug. 31.	1887. Aug. 31.
Stock on warrants in Company's hands, slabs.....	31,854	20,108	15,871
Billiton. Stock here and in Am- sterdam.....	14,643	13,468	14,333
Totals.....	46,497	33,576	30,204
Deliveries of Banca tin.....	8,600	11,746	15,125
Deliveries of Billi- ton tin.....	10,370	8,375	9,550
Totals.....	18,970	20,121	24,675
Deliveries of Banca since January 1.	80,846	92,592	96,601
Deliveries of Billi- ton since Jan. 1.	50,811	59,186	65,537
Banca afloat.....	4,000	4,000	2,900
Banca in comp's hands for coming sales.....	118,455	126,922	73,299
Billiton afloat.....	47,200	46,000	46,975
Price of Banca....	£55	£58 1/2	£62 1/2
Price of Billiton...	54	57 1/2	62 1/2

Since the beginning of the month Banca has advanced to 63 for spot and September sale, and Billiton to 61.50 guilders.—*Koch & Vlierboom.*

GERMANY.

HAMBURG, September 15, 1888.—*Iron.*—The Rhenish-Westphalian Iron market has, on the whole, been dull and unaltered during the week. Spiegel is quoted at 53 marks per ton for 10 % @ 12 % Manganese. It is stated there is a good demand in England for American account for high grade Spiegel and it is hoped that American purchases may also increase in Westphalia. Forge Pig has been firmer at Siegen and sales to the close of the year are reported. Bessemer is neglected; Thomas in request. A larger output of Foundry Pig has been absorbed without difficulty. English Bessemer is bringing 45. Finished Iron sells tolerably well for domestic consumption, but the export trade is still slack therein; this is a weak point. Structural continues doing very well. The activity in Boiler Plates is as great as ever; the price of 170 marks for 5.5 mm. is currently paid, and 150 for Tank Plates. Thin Sheets are looking up. Machine shops, foundries and car works are all busily and remuneratively engaged to the extent of their capacity. The International Steel-Rail syndicate is in a fair way of resuscitation. During the first seven months Germany shipped 71,331 tons of Steel Rails, against 98,900 last year, and England, 597,429, against 556,915. The chief shipments made from both countries were distributed as follows:

	From Germany. 1888. tons.	1887. tons.	From England. 1888. tons.	1887. tons.
To Russia.....	74	52	3,017	8,548
To Scandinavia.....	886	1,184	13,075	20,677
To Spain.....	264	608	8,383	5,107
To Italy.....	845	5,404	2,017	12,015
To Japan.....	1,030		37,562	7,726
To the United States.....	2,270	10,396	39,723	92,941
To Mexico.....			11,049	4,811
To the Argen- tine Republic.....	4,715	1,125	140,088	37,555
To British India.....			183,499	187,244
To Australia....	5,129	9,647	48,677	65,366
Totals.....	14,183	29,448	487,090	441,989

Germany's Steel Rail exportation has, according to the foregoing figures, dwindled down to a comparatively unimportant amount. It is desirable, therefore, to have the syndicate renewed. After this question is solved the one of the price which the Prussian Government railroads are to pay in the future for Steel Rails will have to be considered. *Metals.*—It is asserted that the Spanish Lead mines are ready to join the proposed European convention of producers, the plans for which were laid down at Paris, on June 29 last, but this piece of news still lacks confirmation. Lead is rising and all Metals are firm.—*Borsenhalle.*

Hardware.

Trade continues in fair volume and without special features of importance. The effect of the yellow fever is being felt in Southern trade, and the result will doubtless be a temporary curtailment of business in that section. Prices remain unchanged except in a few cases.

Barb Wire.

The New York Barb-Wire market has the same general features as were indicated in our last report, but instead of the nominal prices then prevailing lower quotations are now openly made. The understanding between the Eastern manufacturers, by which prices were so satisfactorily maintained last season, having terminated, the manufacturers are now in an open market, and this fact will probably have its influence in the direction of lower prices than have prevailed the past season. The present price may be quoted as 3.6 cents to 3.75 cents for Four-Point Galvanized, with only a moderate business. With the concessions that might be obtained for a large order, it is thought by some well-advised parties that Barb Wire would be a safe purchase.

Cut Nails.

There has been no change in the volume of the business being done, or in the tone of the market, quotations remaining \$1.85 to \$1.90 for carload lots, and \$1.90 to \$2 for small lots from store. Little confidence is felt here in the ability of the Western makers to organize the proposed pool.

Wire Nails.

The factories are reported to be generally well supplied with orders, and but little complaint is made of irregularities in price. The fact that a leading Western company is not associated with the other manufacturers in the arrangement for the control of prices does not appear to have any influence in breaking the market, as the company in question are understood to be maintaining prices on the basis agreed upon by the other manufacturers.

Miscellaneous Prices.

The Victor Mfg. Company, Newburyport, Mass., issued a circular relating to the Victor Elastic Cement, which is used for bedding slate, pointing up and preventing leaks in metallic roofs, around chimneys, Copings, Skylights, Gutters, &c. It is described as adhering to all substances, not cracking or peeling off, never becoming brittle, but remaining elastic, hardening into a leather like substance, very durable. It is claimed that Tin, Shingle and Slate roofs can be made permanently water-tight by means of it. The company offer it as a desirable addition to the line handled by Hardware merchants, as well as Lumber Dealers and Dealers in Paints and Building Materials. It is sold at the following prices:

2½ pound cans, per pound.....	5½ cents.
5 pound cans, per pound.....	5 cents.
Tubs, 20 to 125 pounds, per cwt.....	\$4.50
Barrels, per cwt.....	4.50

Besides the prices on Apple Parers which are given in another column, the New Scott Mfg. Co., Baltimore, Md., announce the following quotations on goods of their manufacture:

Hopper Cherry Seeder, per dozen.....	\$3
Melting Ladles, per dozen.....	5 6
1 2 3 4 5 6	
\$1.40 2.00 9.00 12.00 14.40 16.00	
Arctic Ice Creepers, per gross.....	\$24
Safety Ice Creepers, per gross.....	15
The following goods are listed as named, and subject to a discount of 20 per cent.:	
Deacon Can Opener:	
Japanned, per gross.....	\$36.00
Nickel, per gross.....	60.00
Coppered, per gross.....	36.00
New Idea Can Opener, per gross.....	15.00
Rotary Can Opener, per gross.....	20.00
Universal Can Opener, per gross.....	20.00

Fruit Press:	
2 quart, per dozen.....	2.25
4 quart, per dozen.....	3.00
Mammoth Egg Beater, per dozen.....	50.00
Medallion Egg Beater:	
Regular, per gross.....	12.00
Medium, per gross.....	15.00
Victoria Egg Beater, per gross.....	12.00
Diamond Vegetable Grater, per gross.....	5.00
Cyclone Dish Traps, per gross.....	4.00
Peach Pitting Spoon:	
Milled, per gross.....	36.00
Regular Ground, per gross.....	24.00

The Axe manufacturers have been in session, but no action in the matter of prices is reported.

A slight advance has been made in the price of Trace and Fancy Chains, the lowest prices made having been withdrawn. Coil Chain is also held with firmness, without quotable change.

There has been a decline of ¼ cent per pound in the price of Sisal Rope, which is now quoted at the following prices for large lots, with a discount of 1½ per cent. for cash in 10 days:

	per pound.
Sisal, ½ inch and larger.....	9½¢
Sisal, ¾ inch.....	10 ¢
Sisal, 1 and 5-16 inch.....	10½¢
Sisal, Hay Rope.....	9½¢
Sisal, Tarred Rope.....	9 ¢
Sisal, Medium Lath Yarn.....	8½¢

This reduction of price has been made owing to competition among the manufacturers, notwithstanding the fact that Hemp continues scarce and the factories are generally well supplied with orders. Manila Rope continues firm.

The National Association of Spring Manufacturers met last week in Cincinnati, there being a fair representation of the manufacturers. The business transacted was principally of a routine character. E. H. Bourne, of Cleveland, president, and G. S. Smith, Fort Plain, N. Y., acted as secretary.

Apple Parers.

There is comparatively little new in this line, the Parers put on the market being substantially the same as last year, with a few improvements. We give below the names of the machines of the different makers, and the prices at which they are sold:

L. A. Sayre, Newark, N. J., makes the following quotations on Parers of his manufacture:

	Per dozen.
Monarch Peach and Apple Parer.....	\$13.50
Waverly Apple Parer.....	4.50
Ideal Apple Parer, Corer and Slicer.....	4.75

C. E. Hudson, Leominster, Mass., is putting on the market this season the following Apple Parers, which are quoted at the prices named:

	Per dozen.
Rocking Table.....	\$4.00
Little Star Parer, Corer and Slicer.....	5.00
Hudson's New '88 Parer, Corer and Slicer.....	3.75

Since last season an improvement has been made in the Little Star Parer, by which the slicing knife is made stronger, thus, it is claimed, materially improving the machine, as it is less liable to break or get out of order.

The Reading Hardware Company, Reading, Pa., and 81 Reade street, New York, manufacture the following Apple Parers, which are sold at the prices named:

72 Baldwin.....	\$4.25
73 Baldwin.....	5.25
74 Gem.....	5.25
75 Gem.....	5.75
76 Gem.....	5.75
77 Champion.....	6.50
78 Champion.....	7.75
Advance.....	4.75

The New Scott Mfg. Company, Baltimore, Md., quote the following prices on their line of Parers:

Rotary Family Peach Parer, per dozen.....	\$13.50
Mammoth Peach Parer, ".....	6.75
Orion Parer, Corer and Slicer, ".....	4.00
Victor Parer, Corer and Slicer, ".....	13.50
Gold Medal Parer, ".....	4.00

The Penn Hardware Company, Reading, Pa., as mentioned in our report last week, are making the following machines:

	Per doz.
Penn Apple Parer, Corer and Slicer.....	\$4.00
Perfection Apple Parer, Corer and Slicer.....	4.00

The Goodell Company, Antrim, N. H., make the following Parers, which are quoted as below:

Pomona, per doz.....	\$4.00
Turntable, per doz.....	4.50
New Lightning, per doz.....	5.50
White Mountain Potato Parer, per doz.....	4.50
White Mountain Apple Parer, Coring and Slicing Machine, per doz.....	4.50
Antrim Combination Apple Parer, Corer and Slicer and Potato Parer, per doz.....	5.50
Family Bay State Apple Parer, Coring and Slicing Machine, per doz.....	12.00
Improved Bay State Apple Parer, Coring and Slicing Machine, per doz.....	30.00
Eureka 1888 Hand or Power Parer, Coring and Slicing Machine, each.....	17.00

The last-named machine is the Eureka 1886, changed and improved somewhat in construction, and called the Eureka 1888.

In addition to the above machines the Henry C. Hart Mfg Company, Detroit, Mich., make the Standard Apple Parer, which has been on the market for several years.

D. H. Whittemore, who can be addressed care Occidental Hotel, New York, advises us that he is making a large or mammoth Champion for use in evaporating factories, hotels, &c., which is sold at \$6, subject to a discount of 25 per cent.

Items.

We understand that no sale has yet been made of the factory and business of William A. Ives & Co., Hamden, Conn., which are offered for sale by the executors of Mr. Ives, as per announcement on page 47. In view of the fact that this business is long established and well known the opportunity thus offered to manufacturers desiring to carry on the enterprise is referred to as one deserving their favorable consideration.

Holmes & Edwards Silver Company, Bridgeport, Conn., allude to the success of their Mexican Silver Flatware, which they put on the market about three years ago to meet the demand for a line of unplated goods of superior quality, and state that trade has steadily increased on this better grade, while the demand for Silver Metal has also been continued, there being a market for both grades.

The Morley Respirator Company, East Saginaw, Mich., refer to the utility of their Respirator for use in blacking Stoves and have received a letter from a merchant, in which it is highly commended for this use.

The Underhill Edge Tool Company, Nashua, N. H., for whom Sise, Gibson & Co. are agents, 100 Chamber street, New York, have issued a new catalogue of their goods, which represents their well-known list of Axes and Hatchets, Washoe Picks and Mattocks, Bush Hooks, &c., illustrations being given of the different goods, with list prices.

Thomas Devlin & Co., Philadelphia, Pa., have issued a new price list and illustrated catalogue, in which their line of Butts, Hinges, Latches, Hooks, Brackets, Carriage and Harness Hardware and other manufactures are represented.

By the announcement on page 47, it will be seen that the Commercial Exchange, Des Moines, Iowa, are making efforts to secure the establishment of factories in their city, and allude to the advantages of the location. Some particulars are given which are worthy of consideration.

The trade will observe a Special Notice on page 48, in which a Hardwareman announces his desire for a position in a manufacturing, jobbing or commission Hardware business, and alludes to his experience in office, factory and on the road. His extensive acquaintance with the jobbing trade East and West is also referred to.

Bradlee & Co., Philadelphia, Pa., issue a circular in regard to the care and use of Chain, giving valuable suggestions and

Winchester Single Shot Rifles, Plain, Octagon Barrel.	10.13	Inches..... 3 1/4 4 5 6 8 10	
Winchester Single Shot Rifles, Special Sporting.	20.25	38 Caliber S. A. \$9.40 9.65 10 10.50 11.25 12	
Winchester Single Shot Rifles, Special Match.	31.00	88 D. A. 10.40 10.65 11 11.50 12.25 13	
Winchester Single Shot Rifles, Extras.	25.10	Inches..... 4 5 6 6 1/2	
Discount.		44 Caliber S. A. \$11.50 11.75 12 12	
Ballard Sporting Rifles, No. 2, 24-32, 28-32 and 28-32.	\$10.13	44 D. A. 12.50 12.75 .. 13	
Ballard Sporting Rifles, No. 2, 30-32.	10.80		
Ballard Sporting Rifles, No. 2, 30-32 and 30-38.	10.13		
Ballard Sporting Rifles, No. 2, 30-38, Ex. Long.	11.15	22-44 Target, 6 1/2 inch.	18.00
Ballard Gallery Rifles, No. 3, 24-22.	10.14	Shot Gun Implements.	25 %
Ballard Gallery Rifles, No. 3, 24-22.	10.80	Remington Rifle Implements.	25.10 %
Ballard Gallery Rifles, No. 3, 24-22.	11.48	Pistol.	25.10 %
Ballard Gallery Rifles, No. 3, 24-22.	12.83	Cleaning.	25.10 %
Ballard Gallery Rifles, No. 3, 24-22.	15.20	Ideal Reloading Tools.	25.10 %
Ballard Gallery Rifles, No. 3, 24-22.	22.95	Winchester Reloading Tools.	25.10 %
Ballard Gallery Rifles, No. 3, 24-22.	20.25	Wilkinson Loaders.	25 %
Win. Repeating Rifles, 1873 Round.	12.15	Canvas and Leather Goods.	25 %
Win. Repeating Rifles, 1873 Octagon.	13.17	Game Bags, Flasks and Pouches.	25 %
Win. Repeating Rifles, 1878 Round.	13.17	Raymond Extension Ice Skates.	25 %
Win. Repeating Rifles, 1878 Octagon.	14.18	Roller Skates, Nos.	
Win. Repeating Rifles, 1880 Round.	13.17	1, 2, 3, 4 and 5.	\$2.00
Win. Repeating Rifles, 1880 Octagon.	14.18	Raymond Extension Roller Skates, 1B, 3B, 5 1/2 B, 2B.	1.50
Win. Repeating Rifles, Express Round.	16.88	Raymond Extension Roller Skates, 4B and 5B.	1.50
Win. Repeating Rifles, Express Octagon.	18.23	Raymond Extension Roller Skates, Speed.	7.50
Colt's Round, \$12.28; Octagon.	\$13.50	Camping Knives, each 75 cents, dozen.	7.50
Colt's Repeating Rifles, Nos. 1, 6, 7, 8 and 9, Round, \$14.25; Octagon.	\$15.38	Hunting.	25 %
Colt's Repeating Carbines, Round.	12.38	Boxing Gloves.	25 %
Marlin Rifles, 32-40 and 38-56.	13.50	Books.	25 %
Marlin Rifles, 40-60.	14.18	Compasses.	25 %
Marlin Rifles, 28-inch Barrel.	1.00	Oil and Oilers.	25 %
Marlin Repeating Rifles, 38 and 44 W. C. F.	13.17	Rubber Heel Plates.	25 %
Belgian Flobert.	1.75	Breathing Tubes.	25 %
Belgian Flobert.	2.25	Loaded Shot Gun Shells.	20.10 %
Belgian Flobert.	2.50	Webb Loaders.	25 %
Belgian Flobert.	3.00	Rapid Machine Loaders.	25 %
Belgian Flobert.	3.75	Hand Loaded Wood Powder Cartridges.	10 %
Quackenbush Air.	6.00	Blue Rock Traps.	\$5.00
Quackenbush Air.	7.50	Ligowsky.	4.50
Quackenbush Air.	7.50	Peoria.	4.25
Wesson Pocket.	9.75	Raub.	4.50
Wesson Pocket.	10.88	Raub Bases.	7.75
Wesson Pocket.	12.00	Blue Rock Pigeons.	per 1000 9.50
Darts, per dozen, 40 cents. Slugs, per M.	90	Standard Targets.	9.00
Beans' Gun Cane.	20 %	Clay Pigeons.	14.50
Quackenbush Safety Rifle.	\$5.00	Black Birds.	10.00
Sights for Remington and other Rifles.	25.10 %	Raub Card Board Targets.	3.20
Remington Revolvers.		Raub Burnt Clay.	4.50
Revolvers, No. 32.	\$0.70	Police Goods.	25 %
Revolvers, No. 32.	\$0.90	Yacht and Campaign Cannon.	15 %
Revolvers, No. 32.	\$1.00	Finest Bronze Cannon.	10 %
Revolvers, No. 32.	\$1.10	Iron Targets.	25 %
Revolvers, No. 32.	\$1.20	Paper and Pastors.	25 %
Revolvers, No. 32.	\$1.30	White Mountain Chairs and Stands.	25 %
Revolvers, No. 32.	\$1.40	Parts Remington Pistols.	25 %
Revolvers, No. 32.	\$1.50	Rifles.	25 %
Revolvers, No. 32.	\$1.60	Single Guns.	33 1/4 %
Revolvers, No. 32.	\$1.70	Double.	33 1/4 %
Revolvers, No. 32.	\$1.80	Gun Material.	50 %
Revolvers, No. 32.	\$1.90	Rim Fire Cartridges.	50 %
Revolvers, No. 32.	\$2.00	Blanks, 22, Per 1000.	\$1.75
Revolvers, No. 32.	\$2.10	Blanks, 32.	3.50
Revolvers, No. 32.	\$2.20	Other Sizes.	50 %
Revolvers, No. 32.	\$2.30	Central Fire Cartridges, Pistol Sizes.	25 %
Revolvers, No. 32.	\$2.40	Blanks, 25 and 5 10 %	
Revolvers, No. 32.	\$2.50	Cartridges, Sporting and Military.	15 %
Revolvers, No. 32.	\$2.60	Central Fire Cartridges, Sporting and Military.	15 %
Revolvers, No. 32.	\$2.70	Sizes.	15 %
Revolvers, No. 32.	\$2.80	Central Fire Blanks, Sporting and Military.	15 %
Revolvers, No. 32.	\$2.90	Sizes.	15 %
Revolvers, No. 32.	\$3.00	Primed Shells and Bullets.	15 %
Revolvers, No. 32.	\$3.10	Brass Shot Shells, First Grade.	60 %
Revolvers, No. 32.	\$3.20	Draper's.	30 %
Revolvers, No. 32.	\$3.30	Second Grade.	65 %
Revolvers, No. 32.	\$3.40	First Grade, 10 and 12 25 %	
Revolvers, No. 32.	\$3.50	14, 16 and 20 30 %	
Revolvers, No. 32.	\$3.60	A. B. C.	40 %
Revolvers, No. 32.	\$3.70	I. X. L., Waterproof.	40 %
Revolvers, No. 32.	\$3.80	Club, Rival and Climax.	10 %
Revolvers, No. 32.	\$3.90	and 12.	40 %
Revolvers, No. 32.	\$4.00	Paper Shot Shells, Club, Rival and Climax.	14 %
Revolvers, No. 32.	\$4.10	16 and 20.	30 and 10 %
Revolvers, No. 32.	\$4.20	Wads.	20 %
Revolvers, No. 32.	\$4.30	Primers, Berdan, per 1000.	\$1.00
Revolvers, No. 32.	\$4.40	Anvil.	1.20
Revolvers, No. 32.	\$4.50	Hicks No. 2, per 1000.	1.10
Revolvers, No. 32.	\$4.60	Shot Cartridges, Rim Fire.	50 %
Revolvers, No. 32.	\$4.70	Central Fire.	25 %
Revolvers, No. 32.	\$4.80	Percussion Caps, G. D. and S. B., per 1000.	\$0.30
Revolvers, No. 32.	\$4.90	F. L. and F. C.	0.36
Revolvers, No. 32.	\$5.00	Hicks and U. M. C.	0.50
Revolvers, No. 32.	\$5.10	Musket.	0.53
Revolvers, No. 32.	\$5.20	Eley's.	0.55
Revolvers, No. 32.	\$5.30	Double Waterprf.	1.10
Revolvers, No. 32.	\$5.40	Pounds.	1
Revolvers, No. 32.	\$5.50	Powder, Kentucky Rifle.	\$0.30 \$1.50 \$2.75 \$5.00
Revolvers, No. 32.	\$5.60	Duck Shooting.	.90 3.00 5.75
Revolvers, No. 32.	\$5.70	Electric.	.90
Revolvers, No. 32.	\$5.80	Wood Trap.	.68 4.00 15.00
Revolvers, No. 32.	\$5.90	Shot, Drop.	5-lb. bags, 31c.; 25-lb. bags, 1.30
Revolvers, No. 32.	\$6.00	Chilled and Buck, 5-lb. bags, 36c.; 25-lb. bags, \$1.55.	
Revolvers, No. 32.	\$6.10	Pin Fire Shells, Brown, 10 gauge, per 1000.	\$11.50
Revolvers, No. 32.	\$6.20	Pin Fire Shells, Red, 12 and 16 gauges, per 1000.	9.50
Revolvers, No. 32.	\$6.30	Concentrators, Starters, Wads, Patches and Lubricants.	6.00
Revolvers, No. 32.	\$6.40	Paper Cartridges, No. 31, per 1000.	\$6.50
Revolvers, No. 32.	\$6.50	Paper Cartridges, No. 31, per 1000.	7.50
Revolvers, No. 32.	\$6.60	Paper Cartridges, No. 31, per 1000.	10.50
Revolvers, No. 32.	\$6.70	Lefauchaux Cartridges.	50.10 %

tomers who were enjoying the festivities of the city were suddenly called home to prevent being kept out by quarantines. Except for this great calamity trade is excellent, and the larger jobbers, who are already behind in filling orders, are adding to their forces of traveling men. Bar Iron is in good demand from the mills, which ought to put them in fair shape. As a fact, they have no reason to complain, as they get all material at very low prices. Cut Nails are quiet, the pool not having materialized as yet, but more firmness is maintained. Wire Nails pursue the even tenor of their way, not being disturbed, but firmly held at full prices. Some jobbers simply to hold certain trade are selling at below mills' prices; this will soon be evened up. Barded Wire is now considered good property at last low figures, the dealers expecting another advance because the mills say so, but not seeing why there should be at the end of the season, and all the mills running. The demand from store is good.

Principles Applied to the Protection of Trade-Marks.

We reported in a late issue the case of the Russia Cement Company against William N. LePage, in which it was decided that "LePage's Liquid Glue" passed under an assignment which Mr. LePage (as a member of a copartnership) made in 1882 to the Russia Cement Company of the right to use the trade-marks belonging to or in use by said copartnership at that time. The defendant contended that "LePage," being his own name, was not a trade mark, and that in fact he had never assigned his name. He claimed that the name was only a subordinate part of the trade-mark labels attached to the goods, and since these labels had not been in the least imitated, he had a right to use the descriptive phrase "LePage's Liquid Glue," which, in fact it was, to describe his goods. The court said no; but in order that it might not be misunderstood, it added: "While the plaintiff has not sought to prevent the defendant from manufacturing Glue, in order to avoid misunderstanding we add that while the defendant cannot use the words adopted as a trade-name for the article manufactured by him, we do not decide that he may not use the words 'Liquid Glue,' or other appropriate words to describe his product, or to state in that connection that he is himself the manufacturer of it."

The corporation with which Mr. LePage is connected, and which had done business as the "LePage's Liquid Glue and Cement Company," at once changed its name to "The LePage Glue and Cement Company," and changed its labels to read "W. N. LePage's Improved Process Family Glue," because Mr. LePage had obtained a patent for an improved process of making the Glue. They thought that if Mr. LePage could say that he was the manufacturer he could as well say, "Wm. N. LePage's" as "manufactured by Wm. N. LePage." Both phrases certainly indicate that the Glue is Wm. N. LePage's Glue. The Russia Cement Company objected, however, to the change and brought suit against the company (which was brought to trial September 21, at Boston), saying that the company was bound by the former decision against LePage, and that he was not entitled to use this particular collocation of words, viz., William N. LePage's Family Glue.

The court in this last suit said that the defendant could say Liquid Glue manufactured by William N. LePage, or Liquid Glue manufactured by the company, but that they could not say William N. LePage's Liquid Glue.

This decision is of great importance to manufacturers who use their own names in the possessive case. It was not formerly thought that such names were good trade marks—e. g., it was said by Judge Gray, now of the Supreme Court of the United States, while a Massachusetts judge (Gilman vs. Hunnewell, 122 Mass.), that "Hunnewell's Pills" was not a trade-

Trade.

From Louisville our advices under date September 22 are to the following effect:

The Hardware trade of Louisville, Ky., is subject just now to one great disturbing factor. The yellow fever scourge has almost brought business to a standstill in certain sections of several states. Various reports are made by the different dealers, depending on just what trade they reach for, some saying that trade is good, and others giving instances of large orders being canceled. Many cus-

mark. In many other cases the same idea has been expressed. The same court now seems to have changed its position. The labels of these rival manufacturers of Glue have been shown in their advertisements in this paper and merit comparison. No damages were asked against the LePage Glue and Cement Company, and none were awarded. The company has appealed, and the de-

shelves at the top for full packages and pigeon-holes for Malleable Iron Castings. These pigeon-holes consist of three tiers, each pigeon-hole being 9 x 12 inches in the clear, with a 3-inch piece along the front. The upper drawers are about 5 inches square and the bottom ones 9 inches square. The large drawers are divided crossways by a partition. On the counter in front Horse Nails, Nuts, Rivets, Sad Irons and

roll of Belting has a frame made of 1-inch stuff, with a maple roller with an iron pin through it for the Belt to turn on. One of these frames, it will be observed, is shown separate from the rack. These frames fit in the rack, which is made of 2-inch stuff, and are fastened in by hinged strips across the top and bottom of each section. In the basement Nails, Horseshoes, Barbed Wire, Oils, &c., are stored. The

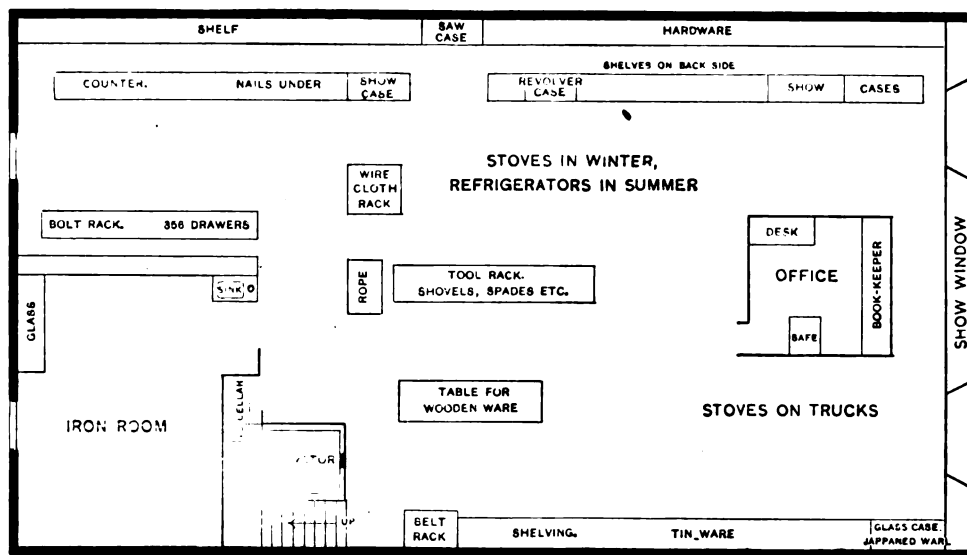


Fig. 270.—Store of Stebbins & Co., Rochester, Minn.

cision of the highest court of the State will be awaited with much interest.

Arrangement of Stores.

Stebbins & Co., Rochester, Minn., furnish us with material for a description of their store, the general arrangement of which is shown in Fig. 270. The office

Seat Springs are accommodated, with Barn-Door Hangers underneath. Their Tool rack, Fig. 272, is stationary, with a shelf high enough to stand Shovels, Spades and D-Handled Forks under and Long-Handled Forks and Shovels on the shelf. This rack is built permanently between two posts in the middle of the store and is very satisfactory. It is about 10 feet long. Both sides are utilized. Five dozen Stove Trucks are used in displaying Stoves, so that each Stove has a truck, permitting it to be moved where it will show to the best advantage. Bird Cages, Sleigh Bells, Coal Hods and numerous other bulky articles are hung on rods suspended from the ceiling. Fig. 273 shows the shelving devoted to Wire Cloth. It is a movable rack of shelves 3½ feet long and 6 feet high, the shelves being far enough apart to admit a roll of Cloth. Next to this, Fig. 274, they have another movable rack of shelves of pigeon-holes for Axe and

tin shop is on the second floor, and runs across the rear. The balance of the second story is used for storage. The arrangements for supplying the building with water, and the methods adopted for

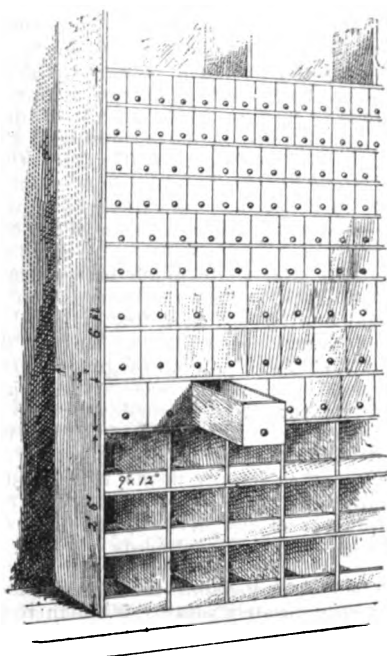


Fig. 271.—Bolt Rack.

occupies, it will be seen, a prominent position in the front of the store, and is referred to as giving a view of the customers as they enter and of what is going on in the store. It is enclosed as high as the standing desk, with a wire railing on top. The elevator is boxed in and is so located that comparatively little space is occupied by it, the stairs going round it, as indicated. Their Bolt rack, Fig. 271, is alluded to as one of the best. There are drawers for 356 sizes of Bolts, with

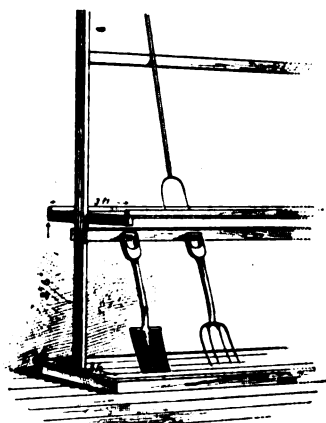


Fig. 272.—Shovel and Fork Rack.

Pick Handles, Hay Knives and Whiffletrees, both ironed and in the rough. Their method of accommodating Belting is shown in Fig. 275. This rack is the same height as the shelving, and stands out from the wall, as shown in the cut, with iron braces by which it is steadied. This rack accommodates three tiers of Belting. Each

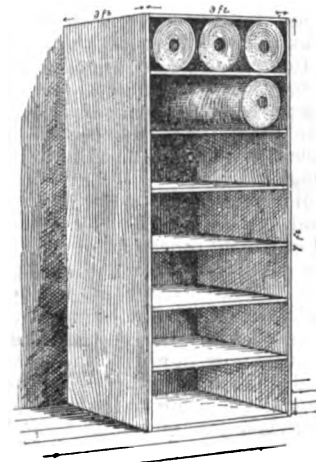


Fig. 273.—Wire Cloth Rack.

keeping it, are also deserving of mention. There is a cistern with force pump and sink behind the door in the Ironroom, and by this water is forced into the tin shop for the sink there. There is also a warehouse 24 x 60 feet for Wagon Stock, and 150 feet of open sheds for Hardwood Lumber, thus giving, it will be observed, together with the Ironroom in the rear of the main store, a complete and convenient arrangement for the business of this enterprising house. A large coal stove is used in the store in cold weather, the tin shop being heated with a furnace in the rear of basement, connected with which is a register in the store, which is sufficient for fall and spring requirements. The smoke-pipe from the furnace runs the whole length of the basement, and is jacketed, with a register from the jacket into the office. Thus, with the furnace, it is pointed out, the shop, basement and office are heated, while it is of use also in

heating the store when necessary. The Oils are kept near the furnace, and thus run freely all winter. The further advantage of this arrangement is that their tinners have no fire to build or look after, no wash water to carry, and no excuse for not attending to business.

The Art of Selling Goods.

By KNARF.

Why we are in the habit of treating persons we are brought in contact with so differently from the treatment we would like to receive ourselves, or the treatment we know would be the most persuasive with us, is an unknown quantity. We say things to them which we expect will produce the results we desire, to make them think as we wish them to

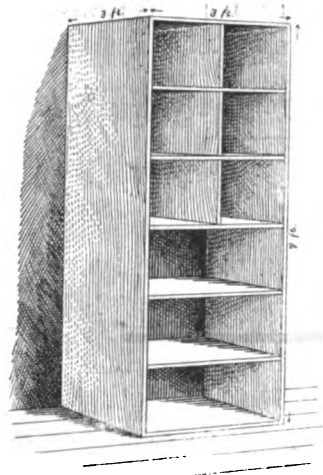


Fig. 274.—Rack for Axe and Pick Handles, Hay Knives, &c.

and see things as we wish them to be seen by them. We know the same things said to us would have an opposite effect, even to making us angry. To deal with people successfully we must be a judge of human nature, and the better judge we are the more successful will we be in our dealings.

Selling goods is a faculty, whether natural or acquired. Some people are good salesmen, others never can be. To dicker is natural to some nations as nations. Yankees have the reputation of being the keenest dealers we have. Get acquainted with your customers and then you will know how to take them. The early drummers were, as a rule, the more successful according to the stock and raciness of their stories, but with the increase of the species, frequency of their visits, rush and competition of business, this accomplishment has fallen into disuse; it does not produce the required results. After a thorough acquaintance with the peculiarities of the person you have to deal with, a knowledge of the goods is indispensable. Their uses, strength and desirable qualities, the purposes for which they are used, can be explained, especially if there is any hesitation on the part of the buyer. The customer will be interested in the purchase very much in proportion as the salesman is. To lay down the article called for on the counter for the customer to examine and employ yourself looking out of the door and whistling will invariably lose you the sale. It will not do, however, to go to the other extreme and be too officious, telling the customers you know it is what they want when they are of the opinion it will not suit. Very few people will stand this.

While it is not well to confuse them by showing too great a variety of the same article, a disposition to sell them what they will afterward consider the best value for their money will be apt to make

them buy of you again. An article which suits them after they get home and answers the purpose required, leaves in their mind a favorable impression of the stock and place of business. Never be so smart as to get ahead of your customer; you will be the loser in the end. It is as a rule better to make a concession than to lose a customer, and to do it in a pleasant manner. There are chronic kickers whom no one can please. While retaining a customer, it is well always to have in mind that you, the salesman, are on the inside of the counter and the one you are dealing with on the other side; that you have the advantage of knowing the cost of the article and the regular selling price. Also that the customer has come in unsolicited to buy, and expects to pay your price if it can be bought for no less.

Confidence in your mode of doing business is created in the purchaser's mind if he realizes you are firm in your price and believe the article is worth what you ask for it. Don't lose your grip and be afraid to ask what you consider a fair price for the goods—it is demoralizing. A firm, courteous refusal to cut the price will seldom lose you a sale. Telling a customer the cost of an article does not often help the matter, as there is always a doubt in his mind as to the truth of your statement. Competition is so great that many resort to selling goods almost at cost to close customers, intending to make the profits from those who are not so well posted or so close in their dealings. In fact, honest, equitable dealing between salesman and purchaser is

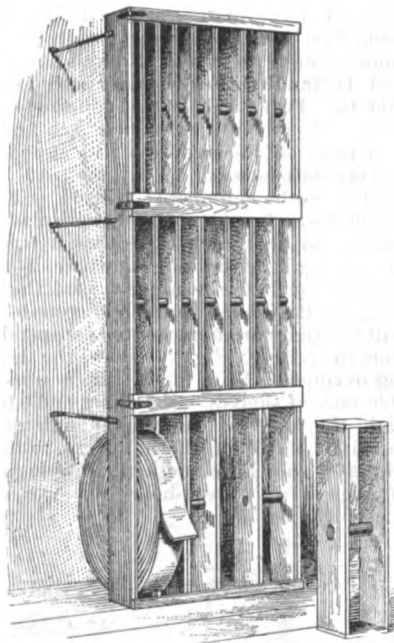


Fig. 275.—Belting Rack.

becoming rare, however much the fact is to be regretted. Short weights or measure, deception in quality or direct falsehood, are too often the rule. While such dealing usually insures short life to the firm practicing it, for the time being it is an injury to the trade.

When unemployed the position of the salesman should be on his feet and near the door. A customer does not like to walk the length of the store to hunt for a salesman—we use the word hunt advisedly—nor should he be expected to. Being near the entrance, your visitor can be taken by the hand, with some commonplace remark about weather, or self or family, and as soon as you see he is ready for business make it easy for him by inquiring what you can show or sell. An abrupt "What will you have," as soon as you have

set eyes on each other, is not pleasant for your customer; it usually comes in anything but a pleasant tone of voice when shot at him in this way. Now that you have him at your mercy exercise your judgment, and treat him as his disposition requires. After you have sold what he asked for do not let him leave the store without the stereotyped question "Will that be all?" In most cases it will recall something he has forgotten, and thus increase the sales. That is what you are there for, do not forget that. Use all legitimate means to sell each one all you can. When he leaves the store, send him away with a "Thank you," "call again," or some benediction. He must not entertain the feeling you care only for what you have got out of him. Have him carry a good impression away, that, coupled with the pleasant reception and fair dealing, will tend to make that store a popular place to trade, not only for him but his friends. This idea of friends of well-treated and satisfied customers extends to a greater distance than we are apt to think.

It is a poor plan to begin waiting on one customer and leaving him to wait on another. The temptation may be great to hold both when help is short, but it is unsatisfactory to the two customers and yourself. If a party comes in merely to price goods or get information, take time to chat when the desired information has been given; he will find you pleasant and favor you with his trade when he needs anything in your line.

It is poor economy to have a poorly lighted store, or a cold one in winter. Try and have it warm, even in front by the door—it will cause customers to linger. We don't mean loaf, for you haven't any room for loafers. But a warm room is conducive to trade, and a cold, uncomfortable one is not. There are certain people whom you dislike, and one is apt to show it, unconsciously it may be, in your dealings with them. Particular care should be taken to be especially polite and courteous, and thus any dislike may be covered. Their dollars are as good as any one's.

Care must be taken to have the goods clean, and shown in an attractive, orderly manner. A show-window full of dead flies, goods piled in indiscriminately, Fly-Traps and Foot-Warmers, Tin Fruit Cans and Stove Boards, does not show attention to business. A show-case arranged in much the same manner does not show the goods. A stock kept up in assortment will fill the wants of your trade much better than a broken stock, or than the same amount of money put largely in a few articles. If people come to your place of business frequently and find you out of goods you are supposed to keep, they receive the impression that your stock is run down or incomplete and will trade elsewhere. These few hints will awaken in the mind of the reader other improvements in method of conducting his business which will be helpful, or at least these suggestions can be adapted to his local needs.

The *Master Mechanic* in a recent issue very appropriately says: "While there is a general call for a class of engineers who will control their engines by means of the reverse lever, is it not well to ask why some one does not call in a still louder voice for a class of locomotive builders who will put more notches in the quadrants? It is safe to say that, while locomotives have only one-third of the notches in the quadrant that it is possible to easily put there, engineers will use the throttle as a governor, if for no other reason than that they are more or less compelled to do so if the regulation is to be at all even. It is difficult to make an intelligent engineer comprehend the importance of following a method which is allowed to appear to be unworthy of the small outlay for a few notches

Improvement in Locks.

The Nashua Lock Co., Nashua, N. H., of whom C. F. Guyon & Co., 99 Reade street, New York, are agents, are calling attention to improvements which they have recently made in their line of locks. Among these they refer to the Nashua N. system of attaching spindles or knobs for

ing the knob, as is liable to be done with the old-fashioned swivel spindle knobs. It is also to be noticed that locks supplied with this patent swivel-spindle hub are made reversible by turning over the latch bolt and both parts of the hub, and, the hub being made to fit $\frac{5}{8}$ -inch spindles, enables the dealer to trim to suit his customers with any size of knobs he carries

its use will be understood as fastening the sashes and preventing them from rattling. The fastener consists of a bolt with a rubber end, such bolt being operated by a lever attached to a cam, thus giving the desired pressure with comparatively little power, easily applied. This simple device is so efficient in operation that it is described by the manufacturers as fastening windows securely so that they cannot be moved without releasing the pressure of the bolt. The rubber end is screwed on instead of being one solid piece, making the fastener adjustable, so that the bolt can be lengthened by slightly unscrewing the rubber end. This fastener is made in bronze, nickel-plate and brass. Its simplicity, efficiency of operation, durability, strength and neatness of appearance, as well as the ease with which it is applied, are the points which are

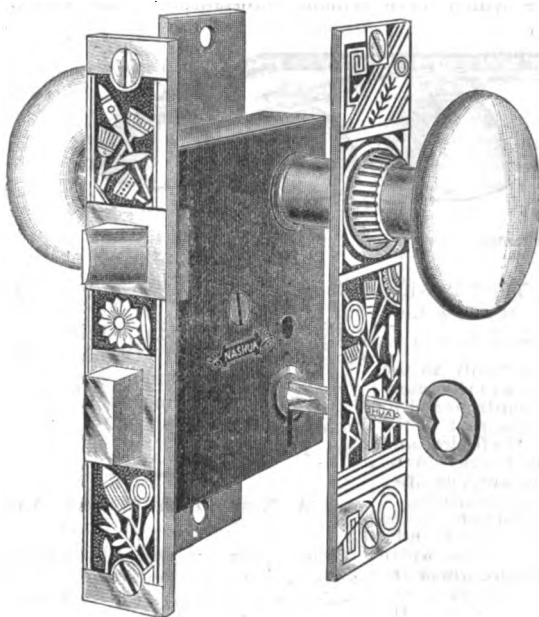


Fig. 1.—Nashua N. System of Knobs.

use with roses only, or rose escutcheon combined; Nashua new steel swivel spindles, and reversible spindle hubs; reversible anti-friction latch, and K system of night work adjustment. We illustrate below two of these specialties. In addition to the customary methods of attaching knobs to spindles the company have perfected and applied for a patent on a plan of their own, which they designate as the N system. In this system the knobs are made with longer shanks than usual and are $\frac{1}{4}$ -inch diameter, so as to go through the rose or rose and escutcheon combined, and rest on each side of the lock case. One knob being riveted to the spindle is intended to be used on the outside of the door. The other knob is fastened by a screw which goes through one side of the shank and through the spindle and is secured firmly by a thread cut in the other side of the shank. The N system is illustrated in the accompanying cut, Fig. 1. The N system of knobs for inside doors have $\frac{1}{4}$ -inch straight spindles, while those designed for outside doors have $\frac{5}{8}$ -inch swivel spindles, which are described as made so that they will work equally well in a solid hub. Among the advantages claimed for the N system are the following: That pulling on the knob made in this way has no tendency to separate or open the lock; that as one knob is always riveted to the spindle, such knob can always be on the outside and would preclude its being taken off and possibly the lock opened; that the N knobs can be kept in place without the least dependence on the roses, thus lessening the friction between knobs, shanks and roses, and enabling one to use roses only with equal advantage as rose and escutcheon combined, and that as the knob screws go entirely through one side of the shank and into the opposite side of the shank they will under no circumstances work loose.

Fig. 2 represents the new steel swivel spindle, $\frac{5}{8}$ inch, with reversible hub, which the company offer as an important improvement in front-door locks. The pin is to prevent any clandestine opening of the door from the outside by pushing the spindle through the hub after remov-

ing the knob. This is regarded as a feature of considerable importance, tending as it does to make an ordinary stock of locks and knobs more than usually available. Any of the company's knobs can be furnished with this new spindle.

Post's Window Fastener.

The accompanying illustration represents a simple and efficient device which

made in regard to it. The low price at which it can be offered is also referred to.

A large iron reservoir is to go up in Malden, Mass. The city has made a contract with the Cunningham Iron Works Company, of Boston, for the sum of \$20,940, to build a wrought-iron reservoir to contain 1,158,000 gallons of water. It will be 75 feet in diameter and 35 feet high, and built of plate iron $\frac{1}{4}$ inch in

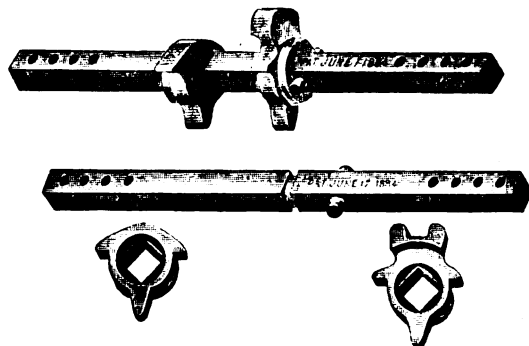
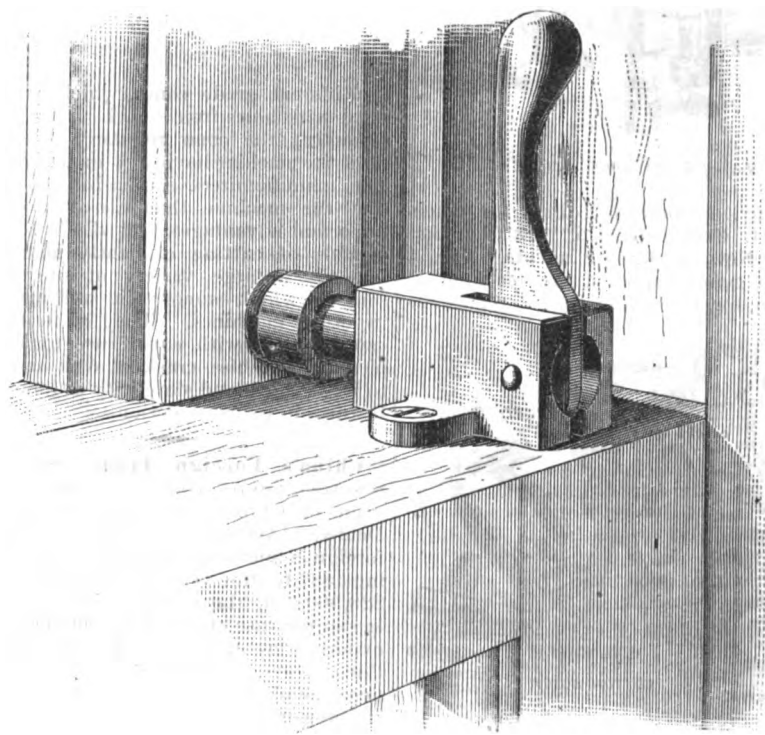


Fig. 2.—Steel Swivel Spindle $\frac{5}{8}$ Inch, with Reversible Hub.



Post's Window Fastener.

has been patented by A. J. Post, of E. L. Post & Co., 10 Peck Slip, New York, by whom it is manufactured and put on the market. It is represented in the cut as

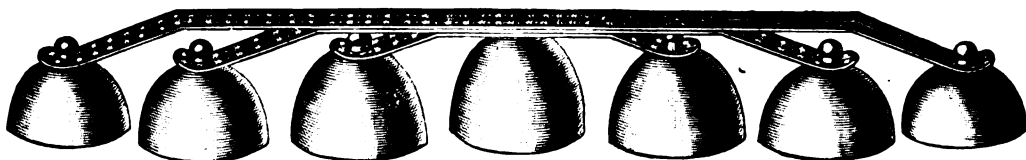
attached to the top of the lower sash, and thickness and of a tensile strain of 50,000 pounds per square inch of section. This reservoir will contain 4344 tons of water when full, and is the largest iron reservoir on this continent.

Musical Pole Chime.

The illustration given below represents one of the new styles of Swiss Tuned Pole Chimes put on the market by the Chapman Mfg. Company, Meriden, Conn. It will be observed that the chime is so arranged that the bells are free from the shaft or pole, giving them a chance to retain the vibration. The cut represents a chime of seven bells, but the chimes are

An interesting feature of this machine is the feeder and the manner in which it operates, it being so constructed that the turning of the crank by means of the eccentric shown moves the feeder in and out, thus forcing into the cutting screw such meat or other substance as is to be operated upon by the machine. The form and construction of the cone are also specially alluded to as embodying new features, in connection with which there

more than \$5,000,000. This is accounted for to some extent also by the decrease in the imports of petroleum. The exports to the United States were valued in 1886 at 11,928,404 taels and in 1887 at 11,545,406 taels. The total trade with the United States was 14,677,487 taels in 1886 and 12,314,310 taels in 1887. Thus it will be seen that our exports to China are falling off, while our imports from that country remain substantially unchanged. The



Swiss Tuned Pole Chime.

made with three or four bells for a single horse on the same principle. The chimes are described as finished in nickel, gold, silver or brass plated, and attuned to the chord of E, and as having a melodious and resonant sound which is very pleasing.

The Crown Meat Cutter.

The illustrations given below represent a new meat cutter, which is being put on the market by the American Machine

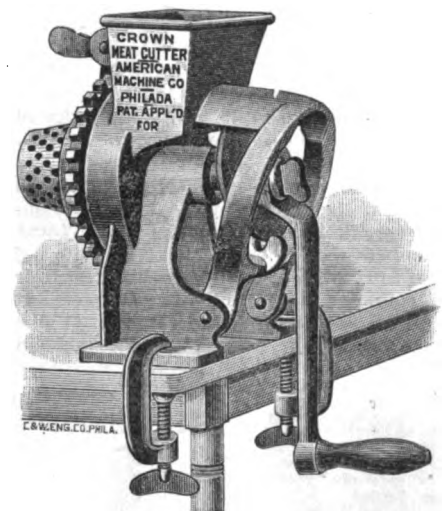


Fig. 1.—The Crown Meat Cutter.

Company, Philadelphia, Pa., for whom John H. Graham & Co., 113 Chambers street, New York, are agents. Fig. 1 gives a general view of the machine in position for use, while Fig. 2 represents

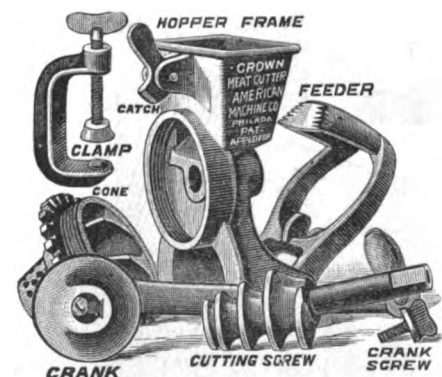


Fig. 2.—Parts of the Crown Meat Cutter.

the parts of which the machine consists. From these illustrations it will be seen that the machine is attached to the table or other fixture by means of clamps, and that the essential parts of the machine are the hopper frame with feeder, the cutting screw, the cone and the crank.

are important advantages. The following instructions for operating the machine will further indicate its special features.

For operation, fasten frame firmly to the table; see that the cone is screwed moderately tight upon the cutting screw, then drop catch in notch to hold it there; the cam part of the crank must lay in the notch of the feeder, and the thumbscrew holds crank in its place on the screw shaft. Drop pieces to be cut, one after the other, in the hopper, and by the turning of the crank these will be pushed forward by the feeder, so that the heel of the screw will catch and force them forward in the cone, where they will be cut between the sharp edges of the revolving screw and those of the stationary oblique knives in the cone (as between the blades of a pair of scissors) and finally be reduced to a uniform size by a further cutting in passing through the holes at the end of the cone.

The manufacturers point out that the work of cutting is thus advantageously divided, and all the unnecessary friction and waste of power avoided. The desired degree of fineness is obtained by the use

balance of trade last year was slightly in our favor—about \$1,000,000—but the anti-Chinese agitation in this country may serve to prejudice the Chinese against buying our products, and as a result we may be deprived of a market in which for a number of years we have been making very fair headway.

A New Form of Cut Nail.

The accompanying illustration represents a new steel cut nail, of which at present the Calumet Iron and Steel Company, of Chicago, are the sole manufacturers. Its sides are parallel, it has a chisel point, and it is cut so light as to run about the same number to the pound as the wire nail. The manufacturers claim a number of advantages for this new form of nail over both the old style of cut nail and the wire nail. The old-style cut nail with a blunt point necessarily break



The "P. C. F." Nail.

of different grade cones, which are supplied with holes from $\frac{1}{4}$ -inch up to $\frac{3}{4}$ -inch diameter, the cone regularly furnished with the machine having $\frac{3}{4}$ -inch diameter. The manufacturers emphasize the point that the machine thus constructed has important advantages, and allude to it as capable of cutting efficiently and satisfactorily a large variety of substances, some of which cannot be as well managed in other machines. They state that it can be used with equal ease for fruits, meats, vegetables, crackers, &c., and refer to its strength and simplicity as important features in its construction.

China's Foreign Trade.—Some interesting figures concerning the foreign trade of China are supplied by Minister Denby. According to these, Chinese foreign commerce increased in value during 1887 to the very important extent of \$28,000,000, the customs revenue showing an increase of nearly \$6,500,000. The exports were greater by \$10,400,000 and the imports increased \$17,740,215. The decrease of trade with the United States is noteworthy, although we are not alone in this respect, for Mr. Denby says that at the 19 treaty ports the imports of English and American drills fell off from 416,699 pieces and 620,803 pieces, respectively, in 1886, to 288,511 pieces and 464,731 pieces, respectively, in 1887. The value of the imports from the United States in 1886 was 4,647,333 taels and in 1887 3,398,390 taels, a decrease of over 1,000,000 taels, or

the fiber of the wood into which it is driven, while the parallel chisel-pointed nail cuts, separates and deflects the fiber slightly downward compactly on the side of the nail, thus causing the wood to fit tightly about it, and excluding moisture to rot the wood, and in time loosen the nail. Being also rough, and of uniform width throughout its length, instead of smooth and wedge-shaped like the old style of cut nail, it naturally has greater holding power. Actual tests are reported by the manufacturers as showing 30 to 75 per cent. more holding power than the old cut nail, and 50 to 100 per cent. more than the wire nail, according to the character of the wood. The new nails are also claimed to drive in hard wood without bending, where the wire nail cannot be used without first boring holes. Being of about the same weight as wire nails, they commend themselves to those who desire light, strong nails at a lower price. They are sold at a slight advance above the price of the ordinary steel cut nail and are branded "P. C. F."

An alloy, the electrical resistance of which diminishes with increase of temperature, has recently been discovered by Mr. Edward Weston. It is composed of copper, manganese and nickel. Another alloy due to the same investigator, the resistance of which is practically independent of the temperature, consists of 70 parts of copper combined with 30 of ferromanganese.

CURRENT HARDWARE PRICES.

SEPTEMBER 26, 1888.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers at the figures named.

Ammunition.

Caps, Percussion, 1000—	
Blacks & Goldmark's	
F. L. Waterproof, 1-10's.....	50¢
B. Trimmed Edge, 1-10's.....	55¢
B. Ground Edge, Central Fire, 1-10's.....	75¢
Double Waterproof, 1-10's.....	1.40
Market Waterproof, 1-10's.....	50¢
G. D.....	35¢
B.....	30¢
Union Metallic Cartridge Co.	
F. C. Trimmed.....	50¢
Cen. Fire Group.....	55¢
Double Waterproof.....	75¢
Double Waterproof, in 1-10's.....	1.40
B. Genuine Imported.....	45¢
Bley & D Waterproof, Central Fire.....	55¢

Cartridges.

Rim Fire Cartridges.....	dis 50¢
Rim Fire Military.....	dis 15¢
Central Fire, Pistol and Rifle.....	dis 25¢
Central Fire, Military & Sporting.....	dis 15¢
Blank Cartridges, except 25 and 35 cal., an additional 10% over above discounts.	
Blank 25 cal.....	dis 1.75
Blank Cartridges, 35 cal.....	dis 2.50
Primed Shells and Bullets.....	dis 15¢
B. Caps, Round Ball.....	dis 1.75
B. Caps, Conical Ball, Swaged.....	dis 2.00

Primers.

Berdan Primers all sizes, and B. L. Caps (for	
Berdan's Shells).....	dis 1.00
All other Primers, all sizes.....	dis 1.20

Shells.

First quality, 4, 8, 10 and 12 gauge.....	dis 25¢
First quality, 14, 16 and 20 gauge (10 list).....	dis 30¢

Star, Club, Rival and 10 gauge, 20 list.....	dis 30¢
Climax Brands, 12 gauge, 20 list.....	dis 35¢
Club, Rival and Climax Brands, 14, 16 and 20 gauge.....	dis 30¢
Seibold's Combination Shot Shells.....	dis 15¢
Brass Shot Shells, 1st quality.....	dis 60¢
Brass Shot Shells, Club, Rival, Climax, 4 & 2 1/2	
A. B. & C. Co., 10 & 12 gauge.....	dis 40¢
A. B. & C. Co., "Special," 10 gauge.....	dis 30¢
A. H. & C. Co., "Special," 10 & 12 gauge.....	dis 40¢
Fowler's Patent, 10 & 12 gauge, 100.....	dis 35¢

Shells Loaded.

List No. 18, 1887.....	dis 20 & 10¢
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U. M. C. & W. R. A.—B. R., 11 up.....	dis 2.00
U. M. C. & W. R. A.—B. R., 9 & 10.....	dis 2.30
U. M. C. & W. R. A.—B. R., 7 & 8.....	dis 2.60
U. M. C. & W. R. A.—P. E., 11 up.....	dis 2.10
U. M. C. & W. R. A.—P. E., 9 & 10.....	dis 2.40
U. M. C. & W. R. A.—P. E., 7 & 8.....	dis 2.70

Shells P. E., 11 up.....

Hew's P. E., 11 up.....	dis 1.75
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Arms.

A. B. & C. Co., 10 & 12 gauge.....	dis 30¢
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Arms.

Armstrong's Mouse Hole.....	dis 35¢
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Arms.

Armstrong's Mouse Hole, Extra.....	dis 1.10
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Arms.

Armstrong's Mouse Hole, Extra.....	dis 1.10
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Arms.

Armstrong's Mouse Hole, Extra.....	dis 1.10
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Armstrong's Mouse Hole, Extra.....	dis 1.10
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Arms.

Armstrong's Mouse Hole, Extra.....	dis 1.10
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Patent Peg, Plain Top.....

Patent Peg, Leather Top.....	dis 12.00
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Awls, Brad Sets, &c.

Awls, Sewing, Common.....	dis 35¢
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Awls, Shouldered Peg.....	dis 40¢
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Awls, Shouldered Brad.....	dis 35¢
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Awls, Handled Brad.....	dis 45¢
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Awls, Handled Scratch.....	dis 55¢
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Awls, Socket Scratch.....	dis 30¢
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Awl and Tool Sets.

Allen's Set, Awls & Tools, No. 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100.....	dis 55¢
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Tray's Ad Tool Hds., Nos. 1, 1 1/2, 2, 2 1/2, 3, 3 1/2, 4, 4 1/2, 5, 5 1/2, 6, 6 1/2, 7, 7 1/2, 8, 8 1/2, 9, 9 1/2, 10, 10 1/2, 11, 11 1/2, 12, 12 1/2, 13, 13 1/2, 14, 14 1/2, 15, 15 1/2, 16, 16 1/2, 17, 17 1/2, 18, 18 1/2, 19, 19 1/2, 20, 20 1/2, 21, 21 1/2, 22, 22 1/2, 23, 23 1/2, 24, 24 1/2, 25, 25 1/2, 26, 26 1/2, 27, 27 1/2, 28, 28 1/2, 29, 29 1/2, 30, 30 1/2, 31, 31 1/2, 32, 32 1/2, 33, 33 1/2, 34, 34 1/2, 35, 35 1/2, 36, 36 1/2, 37, 37 1/2, 38, 38 1/2, 39, 39 1/2, 40, 40 1/2, 41, 41 1/2, 42, 42 1/2, 43, 43 1/2, 44, 44 1/2, 45, 45 1/2, 46, 46 1/2, 47, 47 1/2, 48, 48 1/2, 49, 49 1/2, 50, 50 1/2, 51, 51 1/2, 52, 52 1/2, 53, 53 1/2, 54, 54 1/2, 55, 55 1/2, 56, 56 1/2, 57, 57 1/2, 58, 58 1/2, 59, 59 1/2, 60, 60 1/2, 61, 61 1/2, 62, 62 1/2, 63, 63 1/2, 64, 64 1/2, 65, 65 1/2, 66, 66 1/2, 67, 67 1/2, 68, 68 1/2, 69, 69 1/2, 70, 70 1/2, 71, 71 1/2, 72, 72 1/2, 73, 73 1/2, 74, 74 1/2, 75, 75 1/2, 76, 76 1/2, 77, 77 1/2, 78, 78 1/2, 79, 79 1/2, 80, 80 1/2, 81, 81 1/2, 82, 82 1/2, 83, 83 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Fin line Machines.
 Knox, 4-in. Roll..... \$2.50 each @ dis 35 %
 Knox, 6-in. Roll..... \$3.50 each @ dis 35 %
 Eagle, 4-in. Roll..... \$2.50 each @ dis 35 %
 Eagle, 6-in. Roll..... \$3.50 each @ dis 35 %
 Crown, 4-in. \$2.00; 5-in. \$2.50; 6-in. \$3.00 each, dis 35 %
 Crown Jewel..... 6-in. \$3.50 each, dis 35 %
 American, 5-in. \$2; 6-in. \$2.50; 7-in. \$3.00 each, dis 35 %
 Domestic Fluter..... \$1.50 each, net
 Geneva Hand Fluter, White Metal..... \$1.50 each, net
 Geneva Hand Fluter, No. 1, \$1.5; 2, \$1.50; 3, \$1.60; 4, \$1.70
 Shepard Hand Fluter, No. 85..... \$ don \$12.50, dis 40 %
 Shepard Hand Fluter, No. 110..... \$ don \$11, dis 40 %
 Shepard Hand Fluter, No. 95..... \$ don \$5, dis 40 %
 Clark's Hand Fluter..... \$ don \$12.50, dis 35 %
 Combined Fluter and Sled Iron..... \$ don \$10.00, dis 40 %
 Bello..... \$ don \$10.00, dis 45 %
Finishing Saws.
Fin. Traps.
 Paragon..... \$ don \$1.50 @ 1.75
Feeder Squeezers.
 Blair's..... \$ don \$2.00
 Blair's, "Olimax"..... \$ don \$1.25
Forks.—Hay, Manure, &c. Assoc. Mkt..... \$ don \$0.25
 Hay, Manure, &c. Phila. Mkt..... \$ don \$0 @ \$0.25
Frids, See Spoons.
Freezers, Ice Cream.
 Buffalo Champion..... \$ don \$0.10 & 25 %
 Shepard's Lightning..... \$ don \$5 %
 White Mountain..... \$ don \$5 %
Fruit and Jelly Presses.
 Enterprise Mfr. Co..... \$ don \$0.10 @ 30 %
 Remla..... \$ don \$4.50
 P. Co..... \$ don \$4.50
 Shepard's Queen City..... \$ don \$4 %
Fry Pans.
 High List..... \$ don 75 & 80 @ 75 & 10 %
 No..... 0 1 2 3 4 5 6 7 8
 \$ don..... \$3.75 4.70 5.50 6.55 7.50 8.75 10.00 11.95
 Low List..... \$ don 65 & 70 @ 65 & 10 %
 No..... 0 1 2 3 4 5 6 7 8
 \$ don..... \$3.00 3.75 4.25 4.75 5.25 6.00 7.00 8.00 9.00
Fuse.
 Common Hemp Fuse, for dry ground..... \$2.70
 Common Cotton Fuse, for dry ground..... 2.35
 Single Taped Fuse, for wet ground..... 0.00
 Double Taped Fuse, for very wet ground..... 7.00
 Double Cut Fuse, for very wet ground..... 7.50
 Small Gutta Percha Fuse, for water..... 7.50
 Large Gutta Percha Fuse, for water..... 13.00
Gauges.
 Warrin's Mortise, &c..... \$ don \$0.10
 Starrett's Surface, Center and Scratch..... \$ don \$2.10
 Wire, low list..... \$ don \$1.45
 Wire, Standard, Madden & Co..... \$ don \$1.15
 Wire, Brown & Sharpe's..... \$ don \$1.10 @ 25 %
 "Gimlets."—Nall and Spillars..... \$ don \$0.12 & 25 %
 "Eureka" Gimlets..... \$ don \$0.10
 "Diamond" Gimlets..... \$ don \$0.25
 Double Cut, Shepardson's..... \$ don \$0 @ \$0.25
 Double Cut..... \$ don \$0 @ \$0.25
 Double Cut, Douglass'..... \$ don \$0.10
 "Bee"..... \$ gross \$12, dis 35 @ \$0.25
 "Glue."—Le Page's Liquid..... \$ dis 35 @ \$0.25
 Upton's Liquid..... \$ dis 35 %
 W. N. Le Page's Improved Liquid Glue, \$1.25 @ \$0.25
Glue Pots.
 Tins, Hammered..... \$ don \$0.25 @ \$0.10
 Family, Bowe's "Eureka"..... \$ don \$0.25
 Family, L. F. & C.'s "Bandv"..... \$ don \$0.25
Grindstones.
 Small, at factory..... \$ ton \$7.50 @ 9.0
Grindstone Fixtures.
 Barrett's Patent..... \$ don \$0.10
 Reading Hardware Co..... \$ don \$0.10
Hack Saws.—See Saws.
Halters.—Cover's, Rope, 4-in. Jute..... \$ don \$0.25
 Cover's, Rope, 4-in. Hemp..... \$ don \$0.25
 Cover's Adj. Rope Halters..... \$ don \$0.25
 Cover's Hemp Horse and Cattle Tie..... \$ don \$0.25
 Cover's Jute Horse and Cattle Tie..... \$ don \$0.25
Handled Hammers.
 Navdole's..... List Dec. 1, 1895, \$1.25 @ \$2.41
 Buffalo Hammer Co..... List Jan. 15, '97
 Humason & Beckley..... \$ don \$0 @ \$0.25
 Atlas Tool Co..... \$ don \$0.10 @ 50 %
 Fayette R. Plumb..... \$ don \$0.10 @ 50 %
 C. H. Diamond & Son..... \$ don \$0.10 @ 50 %
 varroe..... \$ don \$0.10
 Magnetic Tool, Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 45

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Cable Laid Italian "	¢ 15	15
India Cable Laid "	¢ 15	15
India Cable Laid "	¢ 15	15
Silver Lake, A Quality, White	50¢	dis 1041045
Silver Lake, A Quality, Drab	.....	55¢	dis 1041045
Silver Lake, B Quality, White	.....	50¢	dis 1041045
Silver Lake, B Quality, Drab	.....	55¢	dis 1041045
Sylvan Spring, A Quality, White	.....	50¢	dis 1041045
Sylvan Spring, Extra Braided, White	.....	50¢	dis 1041045
Sylvan Spring, Extra Braided, Drab	.....	55¢	dis 1041045
Semper Idem, Braided, White	.....	50¢	dis 1041045
Egyptian, India Hemp, Braided	.....	50¢	dis 1041045
Samson, Braided, White Cotton	.....	50¢	dis 80 30425
Samson, Braided, Drab Cotton	.....	55¢	dis 80 30425
Samson, Braided Italian Hemp	.....	55¢	dis 80 30425
Samson, Braided Linen	.....	50¢	dis 80 30425
Seah Leeks.			
Clark's No. 1, \$10.00; No. 2, \$2.00 & gross	.....	dis 2545	
Ferguson's	.....	dis 2545	
Morris and Trumpet, list Aug. 16, 1886	.....	dis 60425	
Walker	.....	dis 1045	
Atwell Mfg. Co.	.....	dis 2545	
Reading	.....	dis 604510	
Hammond's Window Springs	.....	dis 40	
Common Sense, Jan d. Cop'd and Br'ed	.....	¢ gross 44	
Universal	.....	¢ gross 21045	
Kempshall's Gravity	.....	dis 6045	
Kempshall's Model	.....	dis 604510	
Corbin's Delay, list February 15, 1886	.....	dis 7045	
Payson's Perfect	.....	dis 604510	
Hughan's New and Improved Adjustable	.....	dis 604510	
Hughan's New Seah Leeks, list Jan. 8, '87	.....	dis 254545	
Stoddard's "Practical"	.....	dis 1045	
Ives Patent	.....	dis 6045	
Leeche's Nos. 100 & 110, & gro. 35; 106, \$10, dis	.....	dis 20410	
Davis, Brown, Barnes Mfg. Co.	.....	dis 4045	
Chumson No Safety, list March 1, 1886	.....	dis 554545	
Seah	.....	dis 7045	
Seah Weights.			
Solid Eyes	.....	¢ ton 225	
Sausage Stuffers or Fillers.			
Miller's "Challenge"	.....	¢ doz 220, dis 5045045	
Draw Out No. 4	.....	¢ doz No. 1, \$15; No. 2, \$21, dis 5045045	
Peck & Co. Mfg. Co.	.....	dis 2045	
Seah	.....	dis 6045	
Saws.			
Diaston's Circular	.....	dis 454545	
Diaston's Circular	.....	dis 454545	
Diaston's Hand	.....	dis 254545	
Atkins' Circular	.....	dis 5045	
Atkins' Silver Steel Diamond X Cuts	.....	¢ foot 7045	
Atkins' Special Steel Dexter X Cuts	.....	¢ foot 7045	
Atkins' Special Steel Diamond X Cuts	.....	¢ foot 7045	
Atkins' Champion and Electric Tooth X	.....	¢ foot 2745	
Atkins' Hollow Back X Cuts	.....	¢ foot 1845	
Atkins' Shingle, Mulay, Drag, &c.	.....	dis 4545	
W. M. & C. Hand	.....	dis 204545	
W. M. & C. Champion X Cuts, Regular	.....	¢ foot 344545	
W. M. & C. X Cuts, Train Back	.....	¢ foot 374545	
Peace Hand Panel and Rip	.....	dis 204545	
Peace Cross Cuts, Standard	.....	¢ foot 2245	
Peace Cross Cuts, Thin Back	.....	¢ foot 374545	
Richardson's Circular and Mill	.....	dis 454545	
Richardson's X-Cuts, No. 1, 304; No. 2, 374; No. 3, 344	.....	dis 404545	
Star Saw	.....	dis 404545	
Griffin's Hack Saw, Blades only	.....	dis 404545	
Star Hack Saws and Blades	.....	dis 2545	
Diamond Hack Saws and Blades	.....	dis 2545	
Eureka and Crescent	.....	dis 2545	
Saw Frames.			
White Vermont	.....	¢ gross 404545	
Red, Polished, and Varnished	.....	¢ doz \$1.50, dis 2545	
Saw Sets.			
Stillman's Genuine	.....	¢ doz \$5.00 and \$7.75, dis 404545	
Stillman's Imita	.....	¢ doz \$3.25 and \$5.35, dis 404545	
Common Lever	.....	¢ doz \$5.00, dis 404545	
Morrill's No. 1, \$15.00; Nos. 2 & 4, \$34	.....	dis 404545	
Leach's	.....	dis 154545	
Hammer, Hotchkiss	.....	dis 104545	
Hammer, Bemis & Call Co.'s new Patent	.....	dis 304545	
Bemis & Call Co.'s Lever and Spring Hammer	.....	dis 304545	
Bemis & Call Co.'s Place	.....	dis 104545	
Bemis & Call Co.'s Cross Cut	.....	dis 154545	
Alken's Genuine	.....	dis 154545	
Alken's Imitation	.....	dis 154545	
Hart's Patent Lever	.....	dis 154545	
Diaston's Star, 30, No. 15, \$5.50, dis	.....	dis 204545	
Atkins' Lever	.....	per doz No. 1, \$5.00; No. 2, \$3.00	
Croissant & Keller, No. 1, \$15.00; No. 2, \$34.00	.....	dis 404545	
Saw Teels.			
Atkins Perfection	.....	\$15.00; Excelsior \$3.00 & doz	
Scales.			
Hatch, Counter, No. 171, good quality	.....	¢ doz 221	
Hatch, Tea, No. 161	.....	¢ doz \$5.75 & \$7.00	
Union Platform, Plain	.....	\$2.10 & \$2.30	
Union Platform, Striped	.....	\$2.30 & \$2.50	
Chatillon's "Croquet" Trip Scales	.....	dis 2545	
Chatillon's Eureka	.....	dis 2545	
Chatillon's Favorite	.....	dis 4045	
Family, Turnball's	.....	dis 904510	
Scale Beams.			
Scale Beams, List of Jan. 12, '82, dis	.....	dis 504510 & 50451045	
Chatillon's No. 1	.....	dis 4945	
Chatillon's No. 2	.....	dis 6045	
Scrapers.			
Adjustable Box Scraper (B. R. & L. Co.)	.....	\$1.50, dis 204510	
Box, 1 Handle	.....	¢ doz \$4.00, dis 1045	
Box, 2 Handle	.....	¢ doz \$5.00, dis 1045	
Defiance Box and Ship	.....	dis 204510	
Foot	.....	dis 504510 & 6045	
Ship, Common	.....	dis 2545	
Ship, Providence Tool Co.	.....	dis 1045	
Screen Window and Door Frames.			
Porter's Pat. Window and Door Frame	.....	dis 254510	
Screen Corner Irons, Warner's	.....	dis 2545 & 254510	
Stearns' Frames and Corners	.....	dis 2545 & 254510	
Screw Drivers.			
Douglas Mfg Co.	.....	dis 20451045	
Diaston's	.....	dis 554545	
Diaston's Patent Wrench	.....	dis 254545	
Buck Bros.	.....	dis 2545	
Stanley R. & L. Co.'s Varnished Handles	.....	dis 554510	
Stanley R. & L. Co.'s Black Handles	.....	dis 504510	
Sargent & Co.'s No. 1 Forged Handle	.....	dis 60451045	
Sargent & Co.'s Nos. 30, 40 and 60	.....	dis 60451045	
Knapp & Cowles' No. 1	.....	dis 60451045	
Knapp & Cowles' No. 1 Extra	.....	dis 60451045	
Knapp & Cowles' No. 00 & s.	.....	dis 6045 & 50451045	
Stearns'	.....	dis 25451045	
Gay & Parsons	.....	dis 2545	
Champion	.....	dis 254510	
Clark's Patent	.....	dis 2545 & 254545	
Lawford & Andrews	.....	dis 2545 & 254510	
Ellis' Socket and Ratchet	.....	dis 2545 & 254510	
Ellis' Spiral new list	.....	dis 2545	
Kelb's Common Sense	.....	¢ doz 35, dis 254510	

Syracuse Screw-Drive Bits.....	dis 80 & 20&S
Screw Driver, S.S., Parry's.....	? dom. 50¢ & 75
Screw Driver Bit, Parry's.....	? gro 1.25
Pray's Hol. Hdlr. Sets, No. 3, 112.....	dis .55 & 25 & 10
P. D. & Co.'s, All Steel.....	dis 60 ¢
Screws	
Woods Screws—List, Brass, Jan. 27, Iron, July 1, 1887	
Flat Head Iron.....	dis 70 ¢
Round Head Iron.....	dis 85 ¢
Flat Head Bronze.....	dis 68 ¢
Round Head Bronze.....	dis 60 ¢
Flat Head Bronze.....	dis 60 ¢
Round Head Bronze.....	dis 65 ¢
Nails—	
Flat Head, iron.....	dis 55 ¢
Round Head Iron.....	dis 50 ¢
Bench and Hand—	
Bench, Iron.....	dis 55&10 @ 55&10&10
Bench, Wood, Beech.....	? dom \$2.25
Bench, Wood, Hickory.....	dis 20&10
Hand, Wood.....	dis 25&10 @ 25&10&5
Lack, Blunt Point.....	dis 75 ¢
Cochran and Leg, Gimlet Points.....	dis 75 ¢
Bed.....	dis 25&5
Hand Rail, Sargent's.....	dis 60&10
Hand Rail, Humason, Beckley & Co.'s.....	dis 70&10@75
Hand Rail, Am. Screw Co.....	dis 75 ¢
Jack Screws, Millers Falls List.....	dis 50 @ 50&5
Jack Screws, P. S. & W.....	dis 50 @ 50&5
Jack Screws, Sargent.....	dis 60&10 @ 50&10&5
Jack Screws, Stevens.....	dis 40 @ 40&10
Screw Saws.	
Lester, complete, \$10.00.....	dis 25 ¢
Rovers, complete, \$4.00.....	dis 25 ¢
Barnes Builders' and Cabinet Makers', \$15.....	dis 25 ¢
Shears	
American (Cast) Iron.....	dis 75&10 @ 75&10&5
Pruning.....	See Pruning Hooks and Shears
Barnard's Lamp Trimmers.....	? dom \$3.75
Tinners'.....	dis 20&2
Seymours', List Dec. 1881 dis 60&10@10&5	dis 10&5
Hicks, List Dec. 1881, dis 60&10@10&5	dis 10&5
Weinbach's Tailor's Shears.....	dis 35&5
First quality C. S. Trimmers.....	dis 80&80&10
Second quality C. S. Trimmers.....	dis 80&10@80&10
Acme Cast Shears.....	dis 10&10
Diamond Cast Shears.....	dis 10 ¢
Clippers.....	dis 10 ¢
Clips Cast Shears.....	dis 75&10@75&10&5
Howe Bros. & Hulbert, Solid Forged Steel.....	dis 90 ¢
Cleveland Machine Co., Solid Steel Forged.....	dis 70 ¢
Clauss Shear Co., Japanned.....	dis 70 ¢
Clauss Shear Co., Nickeled, same list.....	dis 60 ¢
Shovels	
W. & C. List Dec. 1885.....	dis 60&10 @ 60&5
R. & E. List Dec. 18, 1885.....	dis 55&10
Corbin's.....	dis 60&10@2
Patent Roller.....	dis 60&10&2
Patent Roller, Hatfield's.....	dis 75 ¢
Russell's Anti-Friction, list Dec. 18, 1885.....	dis 60&2
Wheeler's Anti-Friction.....	dis 60 ¢
Shedding Saw—	
R. & E. List Dec. 18, 1885.....	dis 60&10&2
Sargent's list.....	dis 60&10
Reading list.....	dis 60&10&10
Ship Tools.	
L. & L. J. White.....	dis 30&5
Albright & Co., N.Y. Co.....	dis 25 ¢
Shoes, Merce, Mule, &c.	
Horses—	
Burden's, Perkins', Phoenix, at factory.....	\$4.00
Mule—Add \$1 per keg to above prices	
Ox, Wrought—	
Ten lots.....	? 2 94
1000 lots.....	? 2 94
500 & lots.....	? 2 100
Shot.—Eastern prices, 2¢ off. each, 5 days.	
Drop, # bag, 25 ¢.....	\$1.55
Drop, # bag, 5 ¢.....	.84
Buck and Chilled, # 5 ¢ bag.....	\$1.70
Buck and Chilled, # 5 ¢ bag.....	.39
Ames Shovels and Spades	
Ames Shovels, Spades, &c., list Nov. 1, 1885.....	dis 30 ¢
Note.—Jobbers frequently give 5 @ 7½ % extra on above.	
Gillett's Black Iron.....	dis 60&10
Gillett's Black Iron.....	dis 60 @ 60&10
Griffin's Solid Cast Steel R. R. Goods.....	dis 20 ¢
Old Colony (Sanford Fork & Tool Co.).....	dis 20 ¢
St. Louis Shovel Co.....	dis 20 @ 20&7½
Hussey, Biens & Co.....	dis 15 @ 15 ¢
Hubbard & Co.....	dis 20@20&7½
Lehigh Mfg. Co.....	dis 60&10
Payne Patented, & Com. list January, 1886.....	dis 30 ¢
Rowland's (Lowman's Patent).....	dis 50&10 @ 40 ¢
Rowland's Black Iron.....	dis 60&10
Rowland's Steel.....	dis 60&5 @ 60&10
Shovels and Tongs.	
Iron Head.....	dis 60&10@60&10&5
Brass Head.....	dis 60&10&10
Skinner's Thimble.	
Western list.....	dis 75&5 @ 7&10
Columbus Wrt. Steel, list Nov. 1, 1887.....	dis 20 ¢
Coldbrookdall, Iron Co.....	dis 5 @ 10
Utica P. S. T. Skells.....	dis 60 ¢
Utica Turned and Fitted.....	dis 35 ¢
Sieves.	
Bunker Metallic, S. S. & Co., new list.....	dis 50&25&10
Bunker Flour Sifters.....	? dom \$2.00
Smith's Adjustable Sifters.....	? dom \$2.25
Smith's Adjustable Milk Strainer.....	? dom \$2.00
Smith's Adjustable F. & C. Strainer.....	? dom \$1.75
Stoves, Wooden Kims.	
Meach 18, Nested, ? dom.....	70¢
Meach 20, Nested, ? dom.....	80¢
Meach 34, Nested, ? dom.....	\$1.00
Stoves.—School, by case.....	dis 50&10 ¢
Sumps, Harness, &c.	
Anchor T. & S. Mfg Co.....	dis 60 ¢
Fitch's Bristol.....	dis 50&10
Hutchins.....	dis 10 ¢
Andrews.....	dis 50 ¢
Sargent's Patent Guarded.....	dis 70&10&10
Curtis New List.....	dis 40 ¢
Covert.....	dis 50&25
Covert New Patent.....	dis 50&25&10
Covert New R. E.....	dis 60&25
Covert Spring.....	dis 50&10&10 ¢
Soldering Irons.	
Covered Adjustable, list Jan. 1, 1886.....	dis 55&25
Crimble Shaves—Iron.....	dis 45 ¢
Wood.....	dis 30 ¢
Bailley's (Stanley R. & L. Co.).....	dis 40&10
Stearns.....	dis 30&10 @ 30 ¢
Spoke Trimmers.	
Donner's.....	? dom \$10.00, dis 50 ¢
Stearns'.....	? dom \$10.00, dis 50 ¢
Ives.....	No. 1, \$12.00; No. 2, \$12.00; ? dom, dis 55&10
Douglas.....	? dom \$2.00, dis 40 ¢ & 30 ¢
Spears and Forks.	
Stamped Iron—	
Barling, Central Stamping Co.'s list.....	dis 70&10 ¢
Solid Table and Tea, Central Stamping Company's.....	dis 70 ¢
Buffalo S. & T. Co.....	dis 55&25
Steel-Printed—4 mos. or 5 ¢ cash 3) days.	
Meriden Brit. Co., Rogers.....	dis 50 ¢
C. Rogers & Bros.....	dis 50 ¢
Rogers & Bro.....	dis 50 ¢
Barling, Central Stamping Co.....	dis 50&10
Wm. Rogers Mfg. Co.....	dis 50&10 @ 50&10&5
Stearns, Hall, Miller & Co.....	dis 50&10

J. & E. Silver Co., Mexican Silver Co., dis 50¢10 @ 50¢10 1/2
 H. & E. Silver Co., Silver Co., dis 50¢5 @ 50¢5 1/2
 H. & E. Silver Co., Durham Silver Co., dis 50¢5 @ 50¢5 1/2
 German Silver, dis 50¢5 @ 50¢5 1/2
 German Silver, Hall & Elton, dis 50¢5 @ 50¢5 1/2
 Nickel Silver, dis 50¢5 @ 50¢10 1/2
 Britannia, dis 50¢5 @ 50¢5 1/2
 Boardman's Flat Ware, dis 50¢5 @ 50¢5 1/2
 Boardman's Nickel Silver, dis 50¢5 @ 50¢5 1/2
 Boardman's Britannia Spoons, case lots, dis 50¢5 @ 50¢5 1/2
 Springs, dis 50¢5 @ 50¢5 1/2
 Elliptic, Concord, Platform and Half Scroll, dis 50¢5 @ 50¢5 1/2
 Chicago Bolster Springs, dis 50¢5 @ 50¢5 1/2
 Steel and Iron, dis 50¢5 @ 50¢5 1/2
 Nickel Plated, dis 50¢5 @ 50¢5 1/2
 Try Square and T Bevels, dis 50¢5 @ 50¢5 1/2
 Danton's Try Square and T Bevels, dis 50¢5 @ 50¢5 1/2
 Winterbottom's Try and Wite, dis 50¢5 @ 50¢5 1/2
 Starrett's Micrometer Calliper Squares, dis 50¢5 @ 50¢5 1/2
 Fence Staples, Galvanized, Same price as Barb Wire.
 Fence Staples, Plain, See Trade Report.
 Necessaries, dis 50¢5 @ 50¢5 1/2
 Meeks and Dies, dis 50¢5 @ 50¢5 1/2
 Blacksmith's Waterford Goods, dis 50¢5 @ 50¢5 1/2
 Lighthouse Screw No. 2, dis 50¢5 @ 50¢5 1/2
 Reeds' New Screw Plates, dis 50¢5 @ 50¢5 1/2
 Stone, dis 50¢5 @ 50¢5 1/2
 Hindostan No. 1, 3/4; Axe, 5/4; Slips No. 1, 5/4, dis 50¢5 @ 50¢5 1/2
 Sand Stone, dis 50¢5 @ 50¢5 1/2
 Washita Stone, Extra, dis 50¢5 @ 50¢5 1/2
 Washita Stone, No. 1, dis 50¢5 @ 50¢5 1/2
 Washita Stone, No. 2, dis 50¢5 @ 50¢5 1/2
 Washita Slips, No. 1, Extra, dis 50¢5 @ 50¢5 1/2
 Washita Slips, No. 1, dis 50¢5 @ 50¢5 1/2
 Arkansas Stone, No. 1, 4 to 6 in, dis 50¢5 @ 50¢5 1/2
 Arkansas Stone, No. 1, 6 to 9 in, dis 50¢5 @ 50¢5 1/2
 Turkey Oil Stone, dis 50¢5 @ 50¢5 1/2
 Turkey Slips, dis 50¢5 @ 50¢5 1/2
 Lake Superior Slips, dis 50¢5 @ 50¢5 1/2
 Seneca Stone, Red Paper Brand, dis 50¢5 @ 50¢5 1/2
 Seneca Stone, High Rounds, dis 50¢5 @ 50¢5 1/2
 Seneca Stone, Small White, dis 50¢5 @ 50¢5 1/2
 Steve Polish—Joseph Dixon's, dis 50¢5 @ 50¢5 1/2
 Gen, dis 50¢5 @ 50¢5 1/2
 Good M-dal, dis 50¢5 @ 50¢5 1/2
 "Mirror", dis 50¢5 @ 50¢5 1/2
 Lustr, dis 50¢5 @ 50¢5 1/2
 Ruby, dis 50¢5 @ 50¢5 1/2
 Rising Sun, 5/4, lots, dis 50¢5 @ 50¢5 1/2
 Dixon's Plumbago, dis 50¢5 @ 50¢5 1/2
 Sycamore and Carpet Wax, dis 50¢5 @ 50¢5 1/2
 Prior Pridd Stone Enamel, dis 50¢5 @ 50¢5 1/2
 Yates' Liquid, dis 50¢5 @ 50¢5 1/2
 Yates Standard Paste Polish, 10-lb cans, per lb., 15¢
 Jet Black, dis 50¢5 @ 50¢5 1/2
 Japanese, dis 50¢5 @ 50¢5 1/2
 Diamond O. K. Enamel, dis 50¢5 @ 50¢5 1/2
 Bonnell's Liquid Stove Polish, dis 50¢5 @ 50¢5 1/2
 Bonnell's Paste Stove Polish, dis 50¢5 @ 50¢5 1/2
 Tacks, Brads, &c., dis 50¢5 @ 50¢5 1/2
 List Jan. 2, 1888, dis 50¢5 @ 50¢5 1/2
 American Iron Carpet Tacks, dis 50¢5 @ 50¢5 1/2
 Steel Carpet Tacks, dis 50¢5 @ 50¢5 1/2
 Carpet Tacks, dis 50¢5 @ 50¢5 1/2
 American Iron Cut Tacks, dis 50¢5 @ 50¢5 1/2
 Sweden Iron Cut Tacks, dis 50¢5 @ 50¢5 1/2
 Sweden Iron Upholsterers' Tacks, dis 50¢5 @ 50¢5 1/2
 Tinned Sweden Iron Tacks, dis 50¢5 @ 50¢5 1/2
 Tin'd Sweden Iron Upholsterers' Tacks, dis 50¢5 @ 50¢5 1/2
 Gimp and Lace Tacks, dis 50¢5 @ 50¢5 1/2
 Gimp and Lace Tacks, dis 50¢5 @ 50¢5 1/2
 Sweden Iron Trimmers' Tacks, dis 50¢5 @ 50¢5 1/2
 Sweden Iron Miners' Tacks, dis 50¢5 @ 50¢5 1/2
 Sweden Iron Bill Posters' or Railroad Tacks, dis 50¢5 @ 50¢5 1/2
 Sweden Steel Tacks, all kinds (Sweden Iron price list), dis 50¢5 @ 50¢5 1/2
 Copper Tacks, dis 50¢5 @ 50¢5 1/2
 Copper Finishing Trunk and Clout Nails, dis 50¢5 @ 50¢5 1/2
 Finishing Nails, dis 50¢5 @ 50¢5 1/2
 Trunk and Clout Nails, dis 50¢5 @ 50¢5 1/2
 Tinned Trunk and Clout Nails, dis 50¢5 @ 50¢5 1/2
 Sheet Metal Nails, dis 50¢5 @ 50¢5 1/2
 Common and Patent Brads, dis 50¢5 @ 50¢5 1/2
 Hungarian Nails, dis 50¢5 @ 50¢5 1/2
 Zinc Glaziers' Points, dis 50¢5 @ 50¢5 1/2
 Clear Box Nails, dis 50¢5 @ 50¢5 1/2
 Picture-Frame Points, dis 50¢5 @ 50¢5 1/2
 Locking and Case Tacks, dis 50¢5 @ 50¢5 1/2
 Staggered Carpet Tacks, dis 50¢5 @ 50¢5 1/2
 Brush Tacks, dis 50¢5 @ 50¢5 1/2
 Shoe Finders, List Jan. 2, 1888, dis 50¢5 @ 50¢5 1/2
 Lining and Saddle Nails, List Jan. 1, 1888, dis 50¢5 @ 50¢5 1/2
 Silvered, dis 50¢5 @ 50¢5 1/2
 Japanned, dis 50¢5 @ 50¢5 1/2
 Dotted-pointed Nails, dis 50¢5 @ 50¢5 1/2
 Wire Carpet Nails, dis 50¢5 @ 50¢5 1/2
 Wire Brads and Nails, See Nails, Wire
 Steel Wire Brads, H. & E. Mfr. Co.'s, dis 50¢5 @ 50¢5 1/2
 Tap Screws, Common and R.L., dis 50¢5 @ 50¢5 1/2
 Enterprise Mfg. Co., dis 50¢5 @ 50¢5 1/2
 Tapes, Measuring, American, dis 50¢5 @ 50¢5 1/2
 Springs, dis 50¢5 @ 50¢5 1/2
 Cheesterman's, Regular, list dis 50¢5 @ 50¢5 1/2
 Thermometers, Tin Case, dis 50¢5 @ 50¢5 1/2
 Thimble Skreens, See Skreens.
 Ties, Rail, Steel Wire, Standard list, dis 50¢5 @ 50¢5 1/2
 Shears and Snips, P. & W., dis 50¢5 @ 50¢5 1/2
 Punches—See Punches.
 Snips J. Mallinson & Co., dis 50¢5 @ 50¢5 1/2
 Tinware, dis 50¢5 @ 50¢5 1/2
 Stamped, Japanned & Piced, List Jan. 20, 1888, dis 50¢5 @ 50¢5 1/2
 Tins, Bonders, Upettters, &c., dis 50¢5 @ 50¢5 1/2
 Stoddard's Lightning Fire Upettters, dis 50¢5 @ 50¢5 1/2
 Detroit Perfected Tire Bender, dis 50¢5 @ 50¢5 1/2
 Tobacco Cutters, dis 50¢5 @ 50¢5 1/2
 Enterprise Mfg. Co. (Champion), dis 50¢5 @ 50¢5 1/2
 Wood Bottom, dis 50¢5 @ 50¢5 1/2
 All Iron, dis 50¢5 @ 50¢5 1/2
 Wilson's Lock Co.'s, dis 50¢5 @ 50¢5 1/2
 Sarrent's, dis 50¢5 @ 50¢5 1/2
 Acme, dis 50¢5 @ 50¢5 1/2
 Transom Lifters, dis 50¢5 @ 50¢5 1/2
 Wollensack's Patent Iron Bronzed, dis 50¢5 @ 50¢5 1/2
 Revere's Patent Iron Goods list, Jan. 1, 1887, dis 50¢5 @ 50¢5 1/2
 Revere's Real Bronze or Nickel Plate, List Jan. 1, 1887, dis 50¢5 @ 50¢5 1/2
 Excelsior, dis 50¢5 @ 50¢5 1/2
 Shaw's, dis 50¢5 @ 50¢5 1/2
 Payson's Universal, dis 50¢5 @ 50¢5 1/2
 Crown and Star, dis 50¢5 @ 50¢5 1/2
 Traps, dis 50¢5 @ 50¢5 1/2
 Newhouse, dis 50¢5 @ 50¢5 1/2
 Unifed Pattern, dis 50¢5 @ 50¢5 1/2
 Game Blake's Patent, dis 50¢5 @ 50¢5 1/2
 Mouse and Rat, dis 50¢5 @ 50¢5 1/2
 Mouse, Wolf, Choke, dis 50¢5 @ 50¢5 1/2
 Mouse, Round Wire, dis 50¢5 @ 50¢5 1/2
 Mouse, Catch, Wire, dis 50¢5 @ 50¢5 1/2
 Mouse, Catch, em-alive, dis 50¢5 @ 50¢5 1/2

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CURRENT METAL PRICES.

SEPTEMBER 26, 1888.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market reports.

IRON AND STEEL.

Bar Iron from Store.

Common Iron:	
1 to 2 in. round and square.	1.90 @ 2.00¢
1 to 6 in. x 1/2 to 1 in.	
Refined Iron:	
1 to 2 in. round and square.	2.10 @ 2.2¢
1 to 4 in. x 1/2 to 1 in.	
4 to 6 in. x 1/2 to 1 in.	2.30 @ 2.4¢
1 to 6 in. x 1/2 and 5-16	2.30 @ 2.4¢
Rods—1/2 and 11-16 round and sq.	2.20 @ 2.3¢
Bands—1 to 6 x 3-16 to No. 12	2.30 @ 2.4¢
"Burden Best" Iron, base price.	3.00 @
price.	
"Uster"	2.80 @
Norway Rods	4.00 @ 5.00¢

Merchant Steel from Store.

Open-Hearth and Bessemer Machinery,	
Toe Calk, Tire and Sleigh Shoe, base	
price in small lots.	2 1/2¢ @ 3¢
Best Cast Steel, base price in small lots	8 1/2¢ @ 9¢
Best Cast Steel Machinery, base price in	
small lots	5 1/2¢ @ 6¢

For Classification and Extras adopted by the Merchant Steel Association of the United States, June 1, 1888, see *The Iron Age*, June 21, 1888.

Sheet Iron from Store.

Common American.	R. G. Cleaned.
10 to 16.	2.75 @ 2.80¢
17 to 20.	2.85 @ 3.00¢
21 to 24.	3.00 @ 3.10¢
25 and 30.	3.20 @ 3.50¢
27.	3.35 @ 3.75¢
28.	3.50 @ 4.00¢
B. B.	2d qual.
Galv'd, 14 to 20.	4.50 @ 4.80¢
Galv'd, 1 to 24.	4.87 1/2 @ 4.75¢
Galv'd, 25 to 30.	5.25 @ 5.12¢
Galv'd, 27.	5.62 1/2 @ 5.48¢
Galv'd, 28.	6.00 @ 5.85¢
Patent Planished.	10¢ @ 10¢
Russia.	10¢ @ 10¢
American Cold Rolled B. B.	5¢ @ 7¢

English Steel from Store.

Best Cast.	15¢
Extra Cast.	16 1/2¢
Swaged, Cast.	16¢
Best Double Shear.	15¢
Blister, 1st quality.	12 1/2¢
German Steel, Best.	10¢
2d quality.	9¢
3d quality.	8¢
Sheet Cast Steel, 1st quality.	15¢
2d quality.	14¢
3d quality.	13 1/2¢

METALS.

Tin.

Banca, Pigs.	25¢
Straits, Pigs.	25¢
Englian, Pigs.	24 1/2¢
Straits in Bars.	26¢

Tin Plates.

Charcoal Plates.—Bright.	Per box.
Melyn Grade.	
IC, 10 x 14.	\$6.00
IC, 12 x 18.	6.25
IC, 14 x 20.	6.00
IC, 20 x 28.	12.50
IX, 10 x 14.	7.50
IX, 12 x 18.	7.75
IX, 14 x 20.	7.50
IX, 20 x 28.	15.50
DC, 12 1/2 x 17.	5.75
DX, 12 1/2 x 17.	7.25
Calland Grade.	
IC, 10 x 14.	\$6.00
IC, 12 x 18.	6.25
IC, 14 x 20.	6.00
IX, 10 x 14.	7.50
IX, 12 x 18.	7.75
IX, 14 x 20.	7.50
IX, 20 x 28.	15.50
DC, 12 1/2 x 17.	5.75
DX, 12 1/2 x 17.	7.25
Allaway Grade.	
IC, 10 x 14.	\$5.37 1/2 @
IC, 12 x 18.	5.50 @
IC, 14 x 20.	5.37 1/2 @
IX, 10 x 14.	6.25 @
IX, 12 x 18.	6.50 @
IX, 14 x 20.	6.25 @
IX, 20 x 28.	13.00 @
DC, 12 1/2 x 17.	.00 @
DX, 12 1/2 x 17.	6.00 @

Coke Plates.—Bright.

Steel Coke.—IC, 10 x 14, 14 x 20.	\$5.00 @
10 x 20.	7.50 @
20 x 28.	10.25 @
IX, 10 x 14, 14 x 20.	5.75 @
BV Grade.—IC, 10 x 14, 14 x 20.	4.70 @

Charcoal Plates.—Terns.

Dean Grade.—IC, 14 x 20.	\$4.62 1/2 @
20 x 28.	9.25 @
IX, 14 x 20.	5.62 1/2 @
20 x 28.	11.37 1/2 @
Abecarne Grade.—IC, 14 x 20.	4.50 @
20 x 28.	9.00 @
IX, 14 x 20.	5.50 @
20 x 28.	10.80 @

Tin Boiler Plates.

IX, 14 x 20.	112 sheets	\$12.50 @ \$12.75
IX, 14 x 28.	112 sheets	12.75 @
IX, 14 x 31.	112 sheets	14.25 @

Copper.

Duty: Pig, Bar and Ingot, 4¢; Old Copper, 3¢
 1/2 lb. Manufactured (including all articles of
 which Copper is a component of chief value),
 4¢ ad valorem.

Ingot.

Lake.	@ 18 1/2¢
"Anchor" Brand.	@ 17.50¢

Prices adopted by the Association of Copper
 Manufacturers of the United States, December
 10, 1887, being quotations for all sized lots.

Not wider than	Not longer than	And longer than	Weights per square foot and prices per pound.							
			Over 64 oz.	29 to 64 oz.	16 to 28 oz.	14 to 16 oz.	12 to 14 oz.	10 to 12 oz.	8 to 10 oz.	Less than 8 oz.
30—72			25	25	25	26	27	28	31	33
30—72			25	25	25	26	27	28	31	33
36—96			25	25	25	27	29	33	36	
36—96			25	25	26	28	30	34	38	
48—96			25	25	27	29	31	35		
48—96			25	25	28	30	32	36		
60—96			25	25	30	32	37			
60—96			26	27	31					
84—96			26	27						
84—96			27	28						
Over 84 in. wide			28	30						

All Bath Tub Sheets. 16 oz. 14 oz. 12 oz. 10 oz.
 Per pound. \$0.28 0.30 0.32 0.35
 Bolt Copper, 1/2 inch diameter and over, per
 pound.

Circles, 60 inches in diameter and less, 3 cents
 per pound advance over lowest prices of Sheet
 Copper of the same thickness.

Circles, over 60 inches diameter, up to 96 inches
 diameter, inclusive, 5 cents per pound advance
 over lowest prices of Sheet Copper of the same
 thickness.

Circles, over 96 inches diameter, 6 cents per pound
 advance over lowest prices of Sheet Copper of
 the same thickness.

Segment and Pattern Sheets, 3 cents per pound
 advance over price of sheets required to cut
 them from.

Cold or Hard Rolled Copper, 14 ounces per square
 foot and heavier, 1 cent per pound over the fore-
 going prices.

Cold or Hard Rolled Copper, lighter than 14 ounces
 per square foot, 2 cents per pound over the fore-
 going prices.

Copper Bottoms, Pits and Flats.

14 ounce to square foot and heavier.	Per pound.
12 ounce and up to 14 ounce to square foot.	28¢
10 ounce and up to 12 ounce.	31¢
Circles less than 8 inches diameter 2 cents per pound additional.	
Circles over 12 inches diameter are not classed as Copper Bottoms.	

Tinning.

Tinning sheets on one side, 10, 12 and 14 x 48	
each.	8¢
Tinning sheets on one side, 30 x 60 each.	30¢
For tinning boiler sizes, 9 in. (sheets 14 in. x 60 in.), each.	15¢
For tinning boiler sizes, 8 in. (sheets 14 in. x 56 in.), each.	13¢
For tinning boiler sizes, 7 in. (sheets 14 in. x 52 in.), each.	12¢
Tinning sheets on one side, other sizes, per square foot.	2 1/2¢
For tinning both sides double the above prices.	

Planished Copper.

Planished Copper List May 5, 1888.Net.

Brass and Copper Tubes.

Seamless Copper.	Seamless Brass.
3/4 inch 1/2 lb.	50¢
1/2 inch 1/2 lb.	47¢
1/4 inch 1/2 lb.	41¢
1/8 inch 1/2 lb.	39¢
1/16 inch 1/2 lb.	37¢
1/32 inch 1/2 lb.	35¢
1/64 inch 1/2 lb.	34¢
1/128 inch 1/2 lb.	31¢

Roll and Sheet Brass.

Discount from list.10 @ 15 %

Spelter.

Duty: Pig, Bars and Plates, \$1.50 @ 100 lb.
 Western Spelter.5 1/2¢ @ 6¢
 "Bergen Port."5 1/2¢ @
 "Bertha"7 1/2¢ @ 8¢

Zinc.

Duty: Sheet, 2 1/2¢ @ 100 lb.
 600 lb. casks.6 1/2¢
 Per lb.1¢

Lead.

Duty: Pig, 3¢ @ 100 lb. Old Lead, 2¢ @ 100 lb. Pipe
 and Sheets, 3¢ @ 100 lb.
 American.5 1/2¢
 Newark.5 1/2¢
 Bar.6¢
 Pipe, subject to trade discount.7 1/2¢
 Tin-Lined Pipe, subject to trade discount.1¢
 Block Tin Pipes, subject to trade discount.4¢
 Sheet, subject to trade discount.5¢

Solder.

1/2 @ 1/2 (Guaranteed).16¢
 Extra Wiping.13 1/2¢
 The prices of the many other qualities of Solder
 in the market indicated by private brands vary
 according to composition.

Antimony.

Cookson.13 1/2¢ @ 14¢
 Hallett's.11 1/2¢

Plumbers' Brass Work.

Discount
 per cent.
 Ground Bibbs and Stops.55¢ @ 10¢
 Ground Stops, Hydrant Cocks, &c.55¢ @ 10¢
 Corporation Cocks.55¢ @ 10¢

Corporation Cocks, "Mueller" Pattern, from
 Western list.55¢ @ 10¢
 Ground Basin and Shampooing Cocks.50¢ @ 10¢
 Compression Basin Cocks.50¢ @ 10¢
 Compression Basin and Sink Cocks.50¢ @ 10¢
 Compression Pantry Cocks.50¢ @ 10¢
 Compression Double Basin and Shampooing
 Cocks.50¢ @ 10¢
 Compression Double Bath Cocks.50¢ @ 10¢
 Compression Bibbs, Urinal Cocks, Sill Cocks,
 Stops, Hopper Cocks, Hydrant Cocks and
 Ball Cocks.50¢ @ 10¢
 Basin Plugs and Basin Grates.55¢ @ 10¢
 Bath and Wash Tray Plugs.55¢ @ 10¢
 Bath Wastes and Washers, Bath and Basin
 Valves, Sewer and Vacuum Valves, Cistern
 Valves, Pump Valves and Strainers, Ship Closet
 Valves and Suction Baskets.55¢ @ 10¢
 Basin Clamps, Basin Joints and Strainers.55¢ @ 10¢
 Boiler Couplings, Ground Face, per set
 \$1.25.dis 10
 Boiler Couplings, Plain Face, per set. \$1.20.dis 10
 Water Back Valve and Plain Couplings, Solder-
 ing Nipples and Unions.55¢ @ 10¢
 Union Joints.60¢ @ 10¢
 Hydrant Nozzles, Handles and Guides, Sockets
 and Clamps, Street Washer Screws and
 Guides.55¢ @ 10¢
 Hose Goods.55¢ @ 10¢

Steam and Gas Fitters' Brass and Iron Work.

	Discount per cent.
Brass Globe Valves.	60¢ @ 10¢
Finished Brass Globe Valves, with Finished Brass Wheels.	40¢ @ 10¢
Brass Globe Valves, with Patent Wood Wheels.	60¢ @ 10¢
Brass Globe Angle and Corner Valves.	60¢ @ 10¢
Brass Radiator Angle Valves.	60¢ @ 10¢
Brass Radiator Angle Valves, Frink's Patent.	60¢ @ 10¢
Brass Cross and Check Valves.	60¢ @ 10¢
Brass Check Valves.	60¢ @ 10¢
Brass Hose Valves.	60¢ @ 10¢
Brass and Iron Frink Valves.	60¢ @ 10¢
Brass Safety Valves.	60¢ @ 10¢
Brass Vacuum Valves.	50¢ @ 10¢
Brass Whistle Valves.	60¢ @ 10¢
Brass Balance, Back Pressure and Foot Valves.	50¢ @ 10¢
Brass Butterfly and Throttle Valves.	50¢ @ 10¢
Brass Pump Valves.	50¢ @ 10¢
Brass Steam Cocks.	57 1/2¢ @ 10¢
Brass Service, Meter and Union Meter Cocks.	57 1/2¢ @ 10¢
Brass Whistles, Water Gauges and Oil Cups.	60¢ @ 10¢

Brass Hollow Plug, Tallow and Globe Oil Cups.
 50¢ @ 10¢
 Brass Lubricators.60¢ @ 10¢
 Brass Air Valves.60¢ @ 10¢
 Brass Air Cocks.60¢ @ 10¢
 Brass Gauge Cocks.55¢ @ 10¢
 Brass Cylinder Cocks and Steam Bibbs.50¢ @ 10¢
 Brass Swing Joints and Expansion Joints.50¢ @ 10¢
 Brass Test Pumps.50¢ @ 10¢
 Brass Steam Fittings, Rough.60¢ @ 10¢
 Brass Steam Fittings, Finished.50¢ @ 10¢
 Brass Union Joints.50¢ @ 10¢
 Brass Soldering Unions and Nipples.55¢ @ 10¢
 Brass Hose Fittings, Fusible and Boiler
 Plugs.55¢ @ 10¢
 Iron Body Globe, Angle, Cross and Check
 Valves.65¢ @ 10¢
 Iron Body Safety, Throttle, Back Pressure,
 Butterfly and Foot Valves.65¢ @ 10¢
 Iron Cocks, all Iron.65¢ @ 10¢
 All Iron Valves.65¢ @ 10¢

Miscellaneous.

	Discount per cent.
Cast Iron Fittings.	70¢ @ 10
Plugs and Bushings.	75¢ @ 10
Malleable Iron Unions.	67 1/2¢
Malleable Iron Fittings.	85

Paints.

Black, Lamp—Coach Painters'.	22 @ 24¢
Ordinary.	6¢
Black, Ivory Drop, fair.	12 @ 15¢
best.	24¢
Black Paint, in oil.	4¢ @ 5¢
Blue, Prussian, fair to best.	40 @ 50¢
in oil.	45 @ 55¢
"Chinese dry.	70¢
Ultramarine.	18 @ 30¢
Brown, Spanish.	14¢
Van Dyke.	10 @ 12¢
Dryers, Patent American. ass'd cans, 9¢; keg, 7¢	
Green, Chrome.	15 @ 20¢
Green, Chrome in oil.	14 @ 18 @ 20¢
Green, Paris.	good, 30¢; best, 35¢
Green, Paris in oil.	good, 30¢; best, 35¢
Iron Paint, Bright Red.	1/2 lb 24¢
Iron Paint, Brown.	1/2 lb 14¢
Iron Paint, Purple.	1/2 lb 14¢
Iron Paint, Ground in oil, Bright Red.	1/2 lb 61¢
Iron Paint, Ground in oil, Red.	1/2 lb 61¢
Iron Paint, Ground in oil, Brown.	1/2 lb 61¢
Iron Paint, Ground, Purple.	1/2 lb 61¢
Litharge.	61¢
Mineral Paints.	2 @ 4¢
Orange Mineral.	10¢
Red Lead, American.	61¢
Red Venetian (Eng.) dry.	\$1.05 @ \$1.70
Red Venetian in oil.	ass'd cans, 11¢; keg, 8¢
Red Indian Dry.	9 @ 12¢
Rose Pink.	10 @